

FLORA OF PANAMA

BY
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AND COLLABORATORS

PART III

Fascicle 5

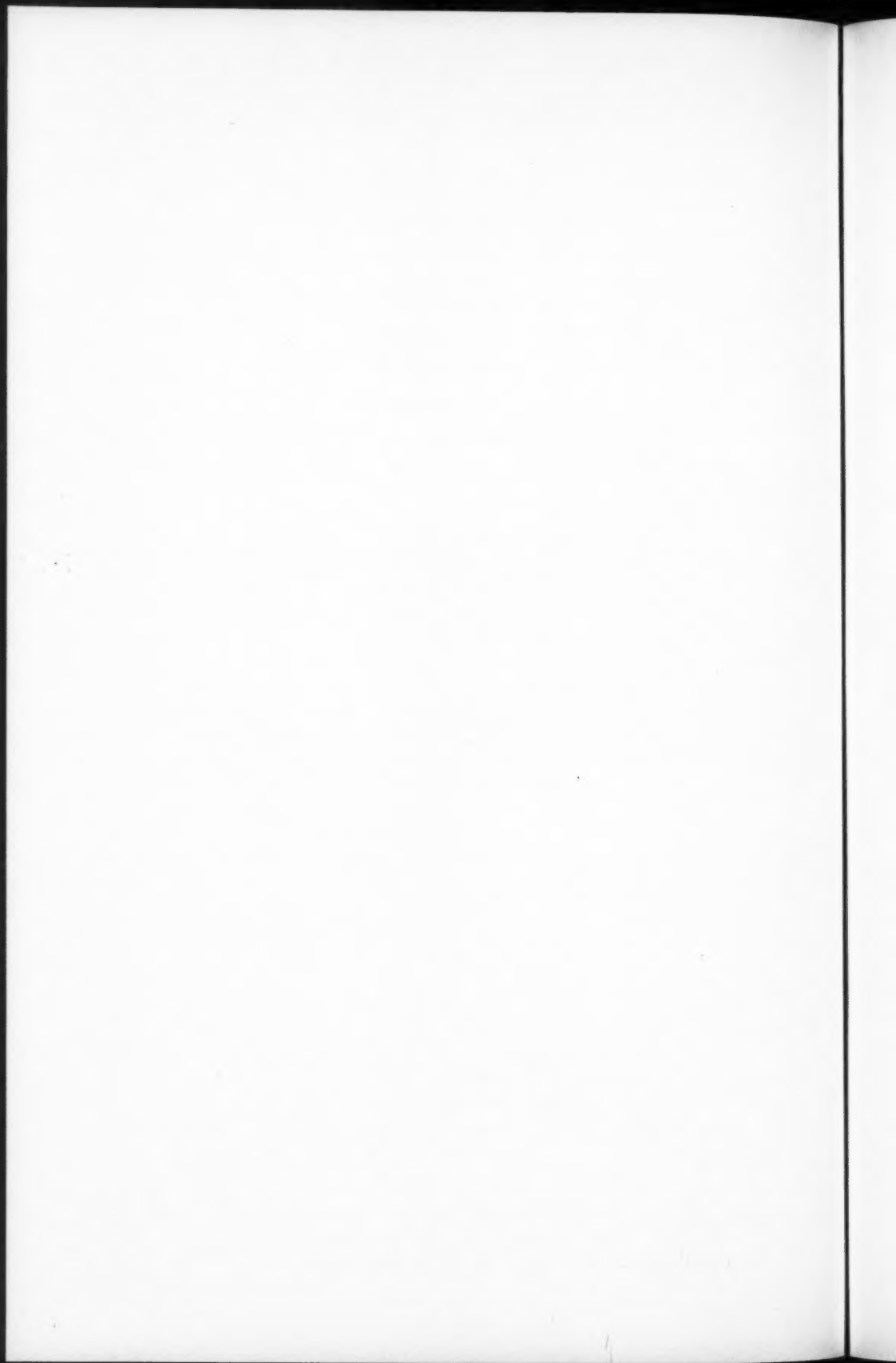
ORCHIDACEAE (P. H. Allen)
(fourth and concluding part)

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FLORA OF PANAMA

Part III. Fascicle 4

ORCHIDACEAE

By PAUL H. ALLEN

66. TRIGONIDIUM Lindl.

TRIGONIDIUM Lindl. in Bot. Reg. 23: t. 1923. 1837; Benth. & Hook. Gen. Pl. 3:567. 1883.

Caespitose, erect, repent, or scandent epiphytic herbs with short ovoid or elliptic-ovoid, compressed, usually ridged and sulcate pseudobulbs, the apices with 1-5 linear to elliptic-lanceolate, coriaceous or subcoriaceous leaves. Inflorescences simple, slender, short or elongate, 1-flowered scapes produced from the bases of the pseudobulbs. Flowers relatively large. Sepals subequal, the bases connivent, forming a tube, the apical portions spreading or reflexed. Petals much smaller than the sepals. Lip distinctly 3-lobed, very small, shorter than the petals, the lateral lobes erect and paralleling the column, the mid-lobe spreading, often thickened or tuberculate, the apex usually recurved; disk with a fleshy, usually ligular callus. Column short, rather stout, semiterete, wingless, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 4, waxy.

A small genus of tropical American epiphytes, ranging from Mexico to Brazil. Two species are known from Panama.

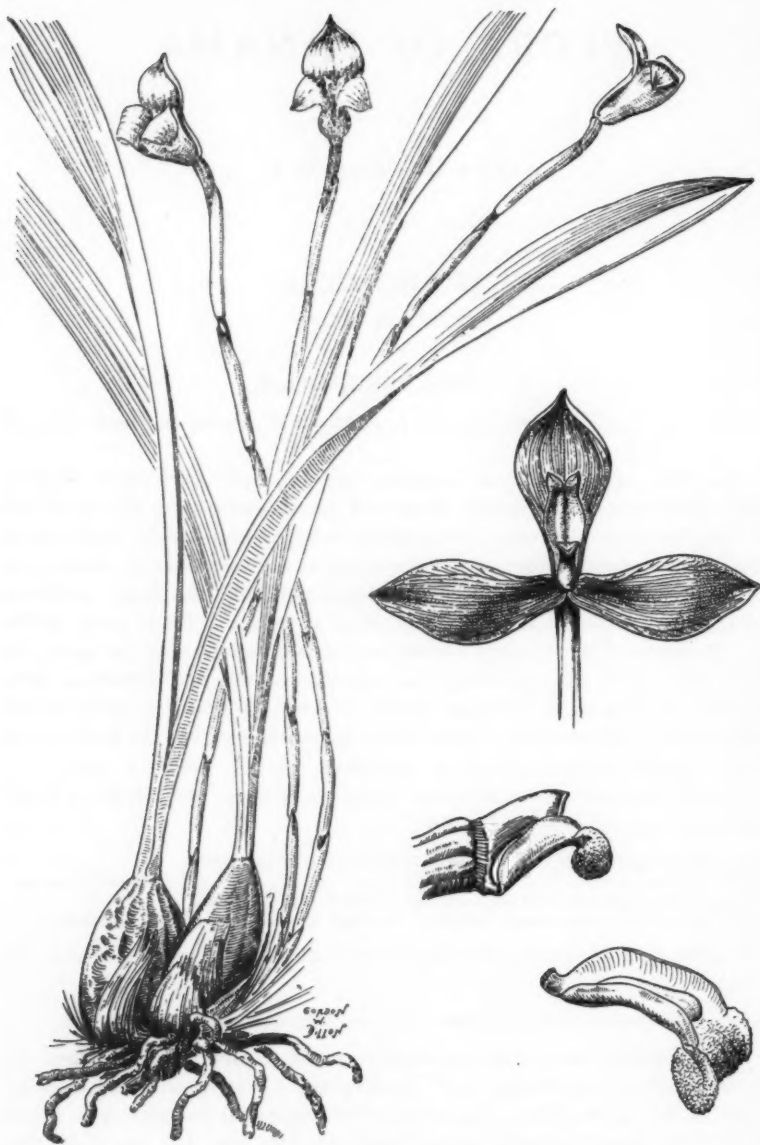
- a. Pseudobulbs approximate, the apex with 2 leaves. Petals not apiculate. Lowland species..... 1. T. EGERTONIANUM
aa. Pseudobulbs widely separated on a cylindric rhizome, the apex with 3-5 leaves. Petals conspicuously apiculate. Highland species..... 2. T. LANKESTERI
1. TRIGONIDIUM EGERTONIANUM Batem. ex Lindl. in Bot. Reg. n. s. 1: Misc. 73. 1838.

Trigonidium Seemannii Rchb. f. in Seem. Bot. Voy. Herald, p. 214. 1854.

Erect epiphytic herbs with approximate, ovoid to elliptic-ovoid, ridged and sulcate, diphyllous pseudobulbs 3.5-7 cm. long and 1.5-4 cm. wide, the bases enveloped in 3-5 brown, imbricating bracts which become fibrous with age. Leaves subcoriaceous, linear-lanceolate, acute, 20-60 cm. long and .8-3 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences 1 to several

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Fig. 186. *Trigonidium Egertonianum*

slender, erect, 1-flowered scapes, 20–40 cm. long, produced from the bases of the pseudobulbs, enveloped throughout in tubular, papery, imbricating bracts. Flowers relatively large. Sepals free, the bases connivent, forming a tube, usually greenish yellow to pinkish tan, with brown or purple stripes; the dorsal sepal elliptic-oblancoate, acute, spreading, 2.5–4.5 cm. long and 1–2 cm. wide, the laterals obliquely oblong to elliptic-lanceolate, acute, the apices strongly recurved, 27–42 mm. long and 8–14 mm. wide. Petals lanceolate to oblanceolate, acute, greenish yellow to pinkish tan, striped brown or purple, 12–22 mm. long and 4–6 mm. wide, with a brown to purple gland-like thickening near the apex. Lip 3-lobed, about $\frac{1}{3}$ the length of the petals, yellowish tan striped brown or red, 5–6 mm. long and 3–4 mm. wide when spread out, contracted at the base and articulated with the base of the column, the lateral lobes erect and paralleling the column, the mid-lobe ovate, acute, pale yellow with a darker center, rather fleshy, $\frac{1}{3}$ to $\frac{2}{5}$ the total length of the lip, the apex recurved and verrucose on both the upper and lower surfaces, the disk with a fleshy ligular callus about equaling the lateral lobes in length. Column semiterete, purple, 4–5 mm. long, the base footless.

Mexico, British Honduras, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Panama, and Colombia.

CANAL ZONE: vicinity Frijoles, sea level, *Powell* 3023; drowned forest of the upper Río Pequeni, Madden Lake region, 70 m., *Allen* 17281; forest along banks above Río Indio Hydrographic Station, Madden Lake region, 70–75 m., *Steyermark* 17426; vicinity Gamboa, 20–100 m., *Pittier* 2613; Barro Colorado Island, Gatún Lake, *Zetek s. n.*, *Woodworth & Vestal* 593. PANAMÁ: along road to Pacora, about 50 m., *Allen* 820; hills east of Panama City, *Powell* 44. COLÓN: Cerro Santa Rita, 1200 ft., *Allen & Fairchild* 5194; Río Gatuncillo, vicinity Santa Rosa, 100 ft., *Allen & Allen* 4159. VERAGUAS: Bahía Honda, *Taylor* 1515; *Elmore H-48*; vicinity Soná, about 100 ft., *Allen & Allen* 4240. BOCAS DEL TORO: vicinity Chiriquí Lagoon, *von Wedel* 2096.

A very common lowland species widely distributed in Central America. It seems probable that it may represent a northern variant of the generic type, *Trigonidium obtusum* Lindl. of British Guiana and Brazil, differing only in the narrower leaves and the absence of an apparently distinct verrucose callus on the under-surface of the apex of the lip.

2. *TRIGONIDIUM LANKESTERI* Ames, in Sched. Orch. 5:32. 1923.

Repent or scandent, epiphytic herbs with ovoid, compressed, ridged and sulcate, tapering pseudobulbs 4–8 cm. tall and 2–3 cm. wide at the base, very distantly spaced on the elongate, cylindric rhizome, the internodes 15–40 cm. long, enveloped in numerous tubular, papery bracts which weather away, the basal portion of the pseudobulbs freely rooting and covered by several rigid, imbricating sheaths which soon weather into loose fibers, the apex of the pseudobulbs with 3–5 leaves. Leaves subcoriaceous, oblong-lanceolate, acute, 15–27 cm. long and 3–4 cm. wide, contracted below into slender, conduplicate petioles which are more or less distichously arranged on the apex of the pseudobulbs. Inflorescences short, usually solitary, 1-flowered scapes 8–16 cm. long, produced from the bases of the pseudobulbs. Sepals subequal, free, the basal half, together with the petals, connivent

and forming a tube, the petals visible between the margins of the dorsal and lateral sepals, the apical half of the sepals strongly reflexed, light greenish tan to cinnamon, veined brown or purplish, elliptic-ob lanceolate, acute, 4.5–5 cm. long and 1.6–2 cm. wide, the dorsal sepal a little narrower than the laterals. Petals broadly oblanceolate, the apices abruptly spreading and conspicuously apiculate or aristate, light greenish tan, veined brown, with purple spots, 20–24 mm. long and 8–10 mm. wide, with an irregular subventricose swelling on the inside below the apicule. Lip 3-lobed, white spotted brown, about 15 mm. long and 5 mm. wide, oblanceolate when spread out, the base contracted and articulated with the base of the column, the lateral lobes erect in natural position, the triangular acute apices projecting, the mid-lobe ovate, obtuse, fleshy, strongly recurved, about $\frac{1}{2}$ the total length of the lip, the upper-surface minutely glandular, the under-surface strongly verrucose, the disk with a ligular, fleshy callus about equaling the lateral lobes in length. Column semiterete, somewhat arcuate, about 1 cm. long, the base without a foot.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 800–1000 m., *Allen 2290*.

An extremely distinctive highland species, immediately separable from the common lowland *Trigonidium Egertonianum* by the elongate rhizome, the 3- to 5-leaved pseudobulbs, the larger flowers, and the apiculate petals.

67. CRYPTOCENTRUM Benth.

CRYPTOCENTRUM Benth. in Jour. Linn. Soc. 18:325. 1881, nom. nud.; Benth. & Hook. Gen. Pl. 3:557. 1883.

Pittierella Schltr. in Fedde Rep. Sp. Nov. 3:80. 1906.

Small erect, epiphytic herbs with 1 to several short stems, usually without pseudobulbs, the cylindric basal portions of the stems enveloped in the rigid, persistent leaf bases. Leaves approximate, 2-ranked, linear to ligular, coriaceous, usually confined to the upper portions of the stems. Inflorescences few to numerous, slender, erect or arching, 1-flowered scapes produced from the bases of the plants, usually less than (but sometimes exceeding) the leaves, the peduncles enveloped in tubular, acute or acuminate, papery sheaths, the uppermost of which is much the longest, completely covering the ovary, only the perianth segments of the flowers being exerted. Flowers relatively small. Sepals narrow, the free portions widely spreading, the dorsal sepal usually a little shorter than the laterals, the bases of which are connate and produced into a long, narrow spur which is appressed to the ovary and nearly equaling it in length. Petals subequal to the dorsal sepal or smaller. Lip continuous with the base of the column, produced into an elongate tubular projection contained within, and nearly equaling the sepaline spur, the free limb entire or more or less divided into a basal and an apical half, the basal half concave to subsaccate, the erect lateral margins enclosing

the column, the apical half usually lanceolate or elliptic-lanceolate and spreading. Column short, very stout, wingless but with the apex usually with a pair of lateral auricles covering the clinandrium, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2-4, waxy.

A small genus of tropical American highland epiphytes, ranging from Costa Rica to Peru. Until more adequate collections are available for study, it would be profitless to speculate on the possible number of valid entities. Although the described species vary considerably in size, the flowers of most seem to be remarkably constant in structure, so that many of the names may eventually be reduced to synonymy or some perhaps retained as local varieties of a few somewhat polymorphic species. Four entities are separable in Panama, largely on a basis of size and vegetative habit.

- a. Plants less than 3 cm. tall. Inflorescences conspicuously exceeding the leaves..... 4. *C. STANDLEYI*
- aa. Plants more than 6 cm. tall. Inflorescences less than, or barely equaling the leaves.
 - b. Plants 6-12 cm. tall. Leaves 3.5 mm. wide or less. Spur 1.2-2.0 cm. long..... 1. *C. GRACILIPES*
 - bb. Plants more than 12 cm. tall. Leaves 3.5 mm. wide or more. Spur about 3 cm. long.
 - c. Leaves narrowly linear, acuminate..... 2. *C. INAEQUISEPALUM*
 - cc. Leaves broadly ligular, unequally emarginate..... 3. *C. LATIFOLIUM*

1. *CRYPTOCENTRUM GRACILIPES* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:246. 1923.

Erect, usually caespitose, epiphytic herbs without pseudobulbs, the plants 6-12 cm. tall. Leaves coriaceous, spreading, approximate, linear-ligular, the apices obtuse or unequally emarginate, 5-10 cm. long and 0.2-0.5 cm. wide, the sheathing bases contracted into short cylindric petioles. Inflorescences numerous slender, erect or arching, 1-flowered scapes usually nearly equaling the leaves in length, enveloped throughout in several papery, tubular, imbricating sheaths. Flowers small, tan or brownish olive. Sepals oblong, obtuse, widely spreading, the free portions 10-13 mm. long and 2.5-3 mm. wide, the laterals oblique and rather narrower than the dorsal sepal, the bases connate and produced into an elongate spur 1.2-2 cm. long, parallel with the ovary and about equaling it in length. Petals obliquely elliptic-lanceolate, acute, 8-10 mm. long and 2-2.5 mm. wide. Lip entire, the free limb lanceolate, obtuse to subacute, 6-8 mm. long and 2.5-3 mm. wide, the base continuous with the base of the column and produced into a long narrow tube which is contained within the elongate, sepaline spur. Column short, stout, about 2 mm. long, the base footless.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., Allen 1911.

2. *CRYPTOCENTRUM INAEQUISEPALUM* C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 12:186. 1946.

Erect, epiphytic herbs without pseudobulbs, the plants 15-25 cm. tall, the short, cylindric stems enveloped below in the persistent leaf bases, the apical por-

tions with 2-ranked foliage. Leaves approximate, linear, acuminate, coriaceous, 12–23 cm. long and 0.35–0.6 cm. wide. Inflorescences numerous slender, 1-flowered scapes produced from the base of the stem, the peduncles entirely invested by several papery, tubular sheaths. Flowers relatively large for the genus, described as being greenish yellow and translucent. Sepals widely spreading above, lanceolate, acute, the dorsal sepal about 15 mm. long and 3.7 mm. wide, the lateral sepals oblique, the free parts about 19 mm. long and 3 mm. wide, the bases connate and produced into an elongate spur which is closely appressed to and about equaling the ovary in length. Petals obliquely lanceolate, acuminate, about 13 mm. long and 3 mm. wide. Lip continuous with the base of the column, the free limb ovate-lanceolate, acute to acuminate when spread out, about 10 mm. long and 4.2 mm. wide, the lower half deeply concave to subsaccate in natural position, the lateral margins enclosing the column, the base produced into a long slender tube contained within the sepaline spur. Column very short, stout, about 2 mm. long, the clinandrium shielded by 2 broad lateral auricles, the base without a foot.

Panama and Peru. To be expected in Colombia and Ecuador.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, in rain forest, 6000 ft., *Davidson 160*.

Our specimens have thicker leaves, but in other respects seem to agree with the Peruvian type.

3. *CRYPTOCENTRUM LATIFOLIUM* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:247. 1923.

Erect, epiphytic herbs without pseudobulbs, the plants 18–25 cm. tall, the short cylindric stems often solitary and apparently monopodial, enveloped below in the rigid, brown, persistent, imbricating leaf bases. Leaves approximate, spreading, broadly ligular, coriaceous, 16–23 cm. long and 1.5–2 cm. wide, the apices rounded and unequally emarginate. Inflorescences a few erect or arching, 1-flowered scapes 8–16 cm. long, produced from the bases of the stems, the peduncles completely invested by several acute, tubular, papery sheaths. Flowers relatively large, rather fleshy, greenish olive or greenish tan. Sepals widely spreading above, the free portions narrowly ligular-lanceolate, acute, 3.5–5 cm. long and 0.5–0.6 cm. wide, the margins often strongly revolute, the lateral sepals oblique, the bases connate and produced into an elongate spur which is closely appressed to the ovary and about equaling it in length. Petals obliquely lanceolate, acute, 3–4 cm. long. Lip continuous with the base of the column, the free portion lanceolate, subacute, about 1.5 cm. long and 0.5 cm. wide, the base produced into an elongate tube which is contained within the sepaline spur, as in the genus. Column short, stout, about 4 mm. long.

Costa Rica and Panama.

GOCLÉ: region north of El Valle de Antón, vicinity La Mesa, 1000 m., *Dunn s. n.* (under *Allen 2762*).

A curious highland species, vegetatively reminiscent of a small *Aerides* or *Vanda*. Our specimen has somewhat smaller measurements than those given for the Costa Rican type, but otherwise seems nearer to it than to any other. Sterile plants of evidently the same species are fairly frequent on the eastern slopes of Chiriquí Volcano between 5000 and 7000 ft.

4. *CRYPTOCENTRUM STANDLEYI* Ames, in Sched. Orch. 9:55. 1925.

Dwarf, epiphytic herbs without pseudobulbs, the tufted plants less than 3 cm. tall. Stems cylindric, rather stout, the lower half covered by the persistent, imbricating leaf bases, the upper half with approximate, more or less 2-ranked foliage. Leaves narrowly linear to oblanceolate, obtuse to subacute, often conduplicate, coriaceous, 5–15 mm. long and 1–2.5 mm. wide. Inflorescences usually 1–2 erect, filiform, 1-flowered scapes 3–4 cm. long, produced from the lower axils of the leaves and conspicuously exceeding the foliage in height. Flowers small, dull red or tan. Sepals spreading, the free portions elliptic-lanceolate, acute, 6–8 mm. long and 1.5–2 mm. wide, the laterals connate at the base and produced into an elongate, slender spur which is closely appressed to the ovary and about equaling it in length. Petals lanceolate, acute, 5–7 mm. long and 1.5–2 mm. wide. Lip continuous with the base of the column, the free portion strongly concave, lanceolate, acute, 6–8 mm. long and about 2 mm. wide, the base prolonged into a slender tube contained within the sepaline spur. Column 2.2–2.5 mm. long, the apex with two lateral auriculate projections.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 600–1000 m., Allen 1685.

68. *TRICHOCENTRUM* Poepp. & Endl.

TRICHOCENTRUM Poepp. & Endl. Nov. Gen. & Sp. 2:11, t. 115. 1837¹; Benth. & Hook. Gen. Pl. 3:559. 1883.

Acoidium Lindl. in Bot. Reg. 23: t. 1951. 1837, nom. nud.

Small, epiphytic herbs with very short, monophyllous stems which are thickened into short, inconspicuous pseudobulbs. Leaves elliptic-lanceolate to ligular, coriaceous or fleshy. Inflorescences usually simple, rarely branching, 1- or rarely 2-flowered scapes, usually very short, but sometimes nearly equaling the leaves. Flowers of moderate size to relatively large. Sepals subequal, free, spreading. Petals subequal to the sepals. Lip entire or obscurely 3-lobed, produced at the base into a spur. Column stout or slender, erect, the apex clavate or with prominent lateral wings or auricles, the base without a foot. Anther terminal, operculate, incumbent, 1-celled, often pubescent or papillose; pollinia 2, waxy.

Perhaps fifteen species of tropical American epiphytes, ranging from Mexico to Peru and Brazil. One species is known from Panama.

¹The date of publication appearing on the title page of this volume is 1838, but evidently parts of it must have been published or in some way available for use earlier since Lindley (in Bot. Reg. 23: t. 1951, April 1, 1837) cited the generic name *Trichocentrum* and the place of publication.

1. *TRICHOCENTRUM PANAMENSE* Rolfe, in Kew Bull. 341. 1913.

Dwarf, epiphytic herbs with minute, monophyllous pseudobulbs, the plants 3–12 cm. tall. Leaves elliptic-lanceolate to ligular, acute, fleshy, 2.5–10 cm. long and 0.8–2.5 cm. wide. Inflorescences slender, horizontal or pendulous, usually unbranched scapes 0.8–4 cm. long, which apparently elongate by progressive stages, producing a succession of moderate-sized solitary flowers. Sepals subequal, free, spreading, pale green or greenish yellow, lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Petals pale green or greenish-yellow, oblong-lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Lip elliptic-ovate, obtuse to acute, explanate or concave, white with a reddish-brown or reddish-purple blotch at the base, the free portion 10–12 mm. long and about 6 mm. wide, the base adnate to the base of the column and produced into a broad, flattened, rather obscurely 4-lobed spur. Column stout, about 5 mm. long, the apex with a pair of broad, fleshy, spreading, subfalcate, obtuse wings on either side of the clinandrium, the base without a foot. Anther white, papillose.

Panama.

CANAL ZONE: trail from Fort Sherman to the mouth of the Río Chagres, sea level, *Powell* 371; upper Río Chagres, sea level, *Powell* 419. PANAMÁ: Cerro Campana, vicinity Campana, 600–800 m., *Dorothy Allen* 3989, 4455. COCLÉ: lower valley and marshes along the Río Antón, 500–600 m., *Hunter & Allen* 384, *Dorothy Allen* 3953, 5077.

This species is very variable in regard to the size and shape of the leaves, and the length of the inflorescences.

69. *IONOPSIS* HBK.

IONOPSIS HBK. Nov. Gen. & Sp. 1:348, t. 83. 1815; Benth. & Hook. Gen. Pl. 3:567. 1883.

Inopsis Steud. Nom. ed. 1, 432. 1821.

Iantha Hook. Exot. Fl. 2: t. 113. 1825.

Cybelion Spreng. Syst. 3:679. 1826.

Epiphytic herbs with short, subcylindric stems invested in 2-ranked foliage, the sheathing leaf bases with or without minute pseudobulbs. Leaves approximate, narrow, coriaceous, the bases imbricating. Inflorescences 1–3 slender, short to elongate, erect or arching, simple or paniculate scapes subterminal or lateral from the axils of the leaves. Flowers of moderate size to small. Sepals subequal, erect or spreading, the dorsal sepal free, the laterals connate at the base and produced into a short sac below the lip. Petals subequal to the dorsal sepal or broader. Lip clawed and adnate to the base of the column, the apical portion broadly expanded, entire or emarginate, conspicuously exceeding the sepals. Column short, stout, erect, the lateral margins not winged, the base without a foot. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A small genus of American epiphytes, ranging from Florida and Mexico through Central America and the West Indies to South America, as far as Bolivia and Paraguay. One species is known from Panama.

Fig. 187. *Ionopsis utricularioides*

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1. *IONOPSIS UTRICULARIOIDES* (Sw.) Lindl. Coll. Bot. t. 39-A. 1821.*Epidendrum utricularioides* Sw. Prodr. 122. 1788.*Dendrobium utricularioides* Sw. in Nov. Act. Soc. Upsal. 6:83. 1799.*Ianthia pallidiflora* Hook. Exot. Fl. 2: t. 113. 1824.*Ionopsis tenera* Lindl. in Bot. Reg. 22: t. 1904. 1836.*Ionopsis pallidiflora* Lindl. loc. cit. sub. t. 1904. 1836.*Ionopsis paniculata* Lindl. loc. cit. 1836.*Ionopsis zonalis* Lindl. & Paxton, in Paxton's Flow. Gard. 2:13. 1851-53, in textu.

Epiphytic herbs 5-12 cm. tall. Leaves approximate, linear-lanceolate to oblong-lanceolate, acute, the blades 3.5-12 cm. long and 0.5-1.5 cm. wide, the mid-vein forming a keel on the under-surface, the sheathing bases sometimes enveloping a minute pseudobulb. Inflorescences 1-3 slender, erect or arching, simple or paniculate scapes 15-60 cm. long, produced from the lateral or subterminal leaf axils, provided with a few distant, inconspicuous sheaths. Flowers few to many, small to relatively large and conspicuous, lavender, rose-purple, or white, superficially resembling those of some species of *Utricularia*. Sepals subequal, not spreading, oblong-lanceolate to elliptic-lanceolate, acute, 3-6 mm. long and 1-2 mm. wide, the dorsal sepal free, concave, the laterals connate at the base and produced into a short, broad, obtuse sac. Petals subequal to the dorsal sepal, elliptic-ovate, acute, or obtuse and shortly apiculate, 2.5-5 mm. long and 1.5-3 mm. wide. Lip about twice as long as the sepals, 5-12 mm. long and 5-12 mm. wide, the apex broadly spreading, deeply emarginate and 2-lobed, contracted at the base into a fleshy, biauriculate claw which is adnate to the base of the column, the apex of the claw with 2 suborbicular, flattened calli. Column short, rather stout, without wings, about 2 mm. long, the base without a foot.

Mexico to Brazil and Paraguay; Florida; West Indies.

CANAL ZONE: vicinity Gamboa, 100 ft., Dorothy Allen 4572. PANAMÁ: hills east of Panama City, sea level, Powell 181.

A common epiphyte widely distributed throughout the lowlands of the American tropics and sub-tropics. The species is very variable in regard to the size of flowers and width of leaves.

70. *RODRIGUEZIA* Ruiz & Pavon

RODRIGUEZIA Ruiz & Pavon, Fl. Peruv. & Chil. Prodr. 115, t. 25. 1794; Benth. & Hook. Gen. Pl. 3:559. 1883.

Burlingtonia Lindl. in Bot. Reg. 23: t. 1927. 1837.*Physanthera* Bert. ex Steudel, Nom. ed. 2, 2:330. 1841, nom. nud.

Epiphytic herbs with short, ovoid or elliptic-oblong, compressed, 1- to 2-leaved pseudobulbs distantly inserted on an elongate rhizome, or approximate, usually almost completely hidden by the conduplicate, imbricating bases of 2 to several conspicuous, foliaceous bracts. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous, ligular to elliptic-lanceolate, obtuse to

acute, or unequally emarginate. Inflorescences 1 to several simple, erect or deflexed racemes, produced from the axils of the foliaceous bracts. Flowers few to many, of moderate size to relatively large and conspicuous. Sepals usually dissimilar, the dorsal sepal free, concave and petaloid, the laterals usually connate for their entire length, forming a single conduplicate segment below the lip, often strongly geniculate or gibbose when seen in profile, or rarely connate for only about half their length, with the acute apices spreading. Petals subequal to the dorsal sepal. Lip usually exceeding the sepals, the base clawed, continuous with the base of the column and produced into a short spur or gibbose projection which is appressed to the ovary, the claw parallel with the column, the free limb spreading, obovate or obcordate, the disk often cristate. Column erect, slender, subcylindric, the apex dilated or subclavate, often with variously shaped arms or auricles, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of attractive tropical American epiphytes, ranging from Costa Rica to Peru and Brazil. Two species are known from Panama.

- a. Inflorescences erect, equaling or exceeding the leaves. Sepals about 1 cm. long..... 2. *R. SECUNDA*
 aa. Inflorescences deflexed, not equaling the leaves. Sepals about 2.5 cm. long..... 1. *R. COMPACTA*

1. *RODRIGUEZIA COMPACTA* Schltr. in Fedde, Rep. Sp. Nov. Beih. 19:144. 1923.

Epiphytic herbs with oblong-elliptic, compressed, monophyllous pseudobulbs 1.5–2.5 cm. long and 1.0–1.5 cm. wide, nearly hidden by the conduplicate imbricating bases of several conspicuous, foliaceous bracts. Leaves from the apex of the pseudobulbs and the blades of the foliaceous bracts oblong-ligular to ligular, coriaceous, the apices obtuse or obscurely emarginate, 6–14 cm. long and 1.5–2.5 cm. wide. Inflorescences 1–2 lax, slender, deflexed, few-flowered racemes 3–4.5 cm. long. Flowers of moderate size, conspicuously larger than those of *Rodriguezia secunda*, pale yellow or greenish yellow with a yellow lip. Sepals dissimilar, the dorsal sepal narrowly oblong, obtuse, concave, about 2.5 cm. long, the laterals connate for their entire length, forming a single conduplicate segment below the lip, about 2.6 cm. long, the apex shortly bifid, the base geniculate in profile. Petals obliquely oblong, obtuse, about 2.5 cm. long. Lip adnate to the foot of the column, about 2.5 cm. long and 1 cm. wide, the free limb obovate-spatulate, the apex deeply emarginate and 2-lobed, the mid-nerve thickened and projecting between the apical lobes as a short apicule, the base produced into a short, curved, subulate spur. Column subcylindric, the apex dilated and subclavate, with projecting arms, the basal half minutely puberulent, the base without a foot.

Costa Rica and Panama.

BOCAS DEL TORO: Río Cricamola, between Finca St. Louis and Konkintöe, about 10–50 m., Woodson 1888.

An apparently attractive species, readily separable from the common *Rodriguezia secunda* by the short, deflexed inflorescences and the relatively large, greenish white or pale yellow flowers.

2. *RODRIGUEZIA SECUNDA* HBK. Nov. Gen. & Sp. 1:367, *t.* 92. 1816.*Pleurothallis coccinea* Hook. Exot. Fl. 2: *t.* 129. 1815.*Rodriguezia lanceolata* Lodd. Bot. Cab. 7: *t.* 676. 1822, non *R. lanceolata* R. & P.*Rodriguezia secunda* HBK. var. *panamensis* Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:75. 1922.

Erect, epiphytic herbs with oblong-elliptic, compressed, monophyllous pseudobulbs 2–3.5 cm. long and 1.0–1.6 cm. wide, almost completely covered by the conduplicate, imbricating bases of the 4–7 conspicuous, foliaceous bracts. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts coriaceous to rather fleshy, linear-ligular to elliptic-oblong, obtuse, subacute or unequally emarginate at the apex, 7–24 cm. long and 1–3.5 cm. wide. Inflorescences 1–6 erect or arching, unbranched, unilateral racemes 15–38 cm. tall. Flowers many, rather small, pink to rose-red. Sepals dissimilar, not spreading, the dorsal sepal concave, ovate, obtuse with a minute apicule, or subacute, 9–12 mm. long and 5–6 mm. wide, the lateral sepals connate for their entire length, forming a single, conduplicate segment below the lip, 10–15 mm. long, the base conspicuously gibbose or geniculate when seen in profile. Petals obovate, shortly acute or apiculate, 9–12 mm. long and 6–7 mm. wide. Lip entire, obscurely clawed, the biauriculate claw adnate to the base of the column and produced into a very short spur, the free limb oblong-obovate, with undulate margins, 12–15 mm. long and 5–7 mm. wide, the apex deeply emarginate and 2-lobed, the disk with a prominent fleshy bicarinate callus. Column subcylindric, the apex rather dilated and subclavate, with 2 short projecting teeth on the under-side.

Panama, Colombia, Venezuela, British Guiana, Surinam, and Trinidad.

CANAL ZONE: vicinity Frijoles, sea level, *Powell* 3184; along Río Chagres, between Gamboa and Alahuela, 30–60 m., *Allen* 962; Gatún Lake, sea level, *Powell* s. n. PANAMÁ: hills east of Panama City, *Powell* s. n.; vicinity Paja, near Empire, sea level, *Powell* 3194; vicinity Juan Mina, Río Chagres, 100 ft., *Allen & Allen* 4133. COLÓN: Cative-Porto Bello trail, sea level, *Powell* s. n.

71. *TRIZEUXIS* Lindl.

TRIZEUXIS Lindl. Collect. Bot. *t.* 2. 1823; Benth. & Hook. Gen. Pl. 3:566. 1883.

Trixeuxis Lindl. Orch. Sel. 15. 1826.

Small epiphytic herbs with short, distichous, foliaceous stems, the imbricating leaf bases distichously arranged in the form of an open fan and usually enveloping a small, monophyllous pseudobulb. Leaves falcate to gladiate, acute. Inflorescences paniculate scapes produced from the bases of the pseudobulbs and conspicuously exceeding the leaves. Flowers subglobose, minute, in dense racemes terminating the branches of the panicle. Sepals dissimilar, of about equal length, the dorsal sepal arching, deeply concave, the laterals connate for nearly their entire length, forming a single bifid segment below the lip. Petals elliptic-ovate, obtuse or subacute, about as long as the sepals. Lip entire, concave, articulated with the

base of the column, the lateral margins erect and parallel with the column, the apex rather fleshy and recurved. Column subcylindric, erect, the base without a foot. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

Two or three species of small American epiphytes ranging from Costa Rica to Trinidad, Brazil, Bolivia, and Peru. One species is known from Panama.

1. *TRIZEUXIS FALCATA* Lindl. Collect. Bot. t. 2. 1823.

Trizeuxis andina Schltr. in Fedde, Rep. Sp. Nov. Beih. 10:52. 1922.

Small to minute, erect, epiphytic herbs 2.5–10 cm. tall, with short, distichous, foliaceous stems, the imbricating leaf bases usually enveloping a small, subquadrate, compressed, monophyllous pseudobulb. Leaves falcate or gladiate, acute or acuminate, the complanate blades 1.5–8 cm. long and 0.3–1.0 cm. wide, the imbricating bases distichously arranged in the form of an open fan. Inflorescences slender, erect, paniculate scapes 3–20 mm. long, produced from the bases of the pseudobulbs, conspicuously exceeding the leaves. Flowers subglobose, minute, in dense, subcapitate or elongate racemes terminating the branches of the panicle. Sepals dissimilar, of about equal length, green or pale yellow, the dorsal sepal ovate, acute, arching and deeply concave, about 2 mm. long, the laterals connate for nearly their entire length, forming a single obovate, bifid segment about 2 mm. long below the lip. Petals elliptic-ovate, obtuse or subacute, about as long as the sepals. Lip entire, lanceolate, acute, about 2.5 mm. long, the base concave, the lateral margins erect and closely appressed to the sides of the column, the apex rather fleshy and recurved, ovate, acute, yellow or orange, about $\frac{1}{3}$ the total length of the lip. Column short, stout, subcylindric, about 1 mm. long, the apex somewhat dilated, the base without a foot. Anther very large in proportion to the size of the flower, about 1.2 mm. long.

Costa Rica, Panama, Venezuela, Trinidad, Brazil, Bolivia, and Peru.

VERAGUAS: vicinity Santiago, 700 ft., Powell 3526. CHIRIQUÍ: vicinity Concepción, 800 ft., Powell 286.

72. *TRICHOPILIA* Lindl.

TRICHOPILIA Lindl. Nat. Syst. Bot. ed. 2, 446. 1836; Benth. & Hook. Gen. Pl. 3:559. 1883.

Pilumna Lindl. in Bot. Reg. n. s. 7: Misc. 73. 1844.

Helcia Lindl. loc. cit. 8: Misc. 17. 1845.

Leucobyle Klotzsch, in Ind. Sem. Hort. Bot. Berol. App. 1. 1854.

Trichophila Pritz. Icon. Bot. Ind. 1115. 1855, sphalm.

Erect epiphytic herbs with approximate monophyllous pseudobulbs. Leaves subcoriaceous to coriaceous or sometimes fleshy, usually elliptic-lanceolate to ligular, rarely narrowly linear or semiterete. Inflorescences slender, short or elongate, erect, arching or pendulous, 1- to 7-flowered scapes produced from the bases of the pseudobulbs. Flowers usually large and attractive. Sepals narrow,

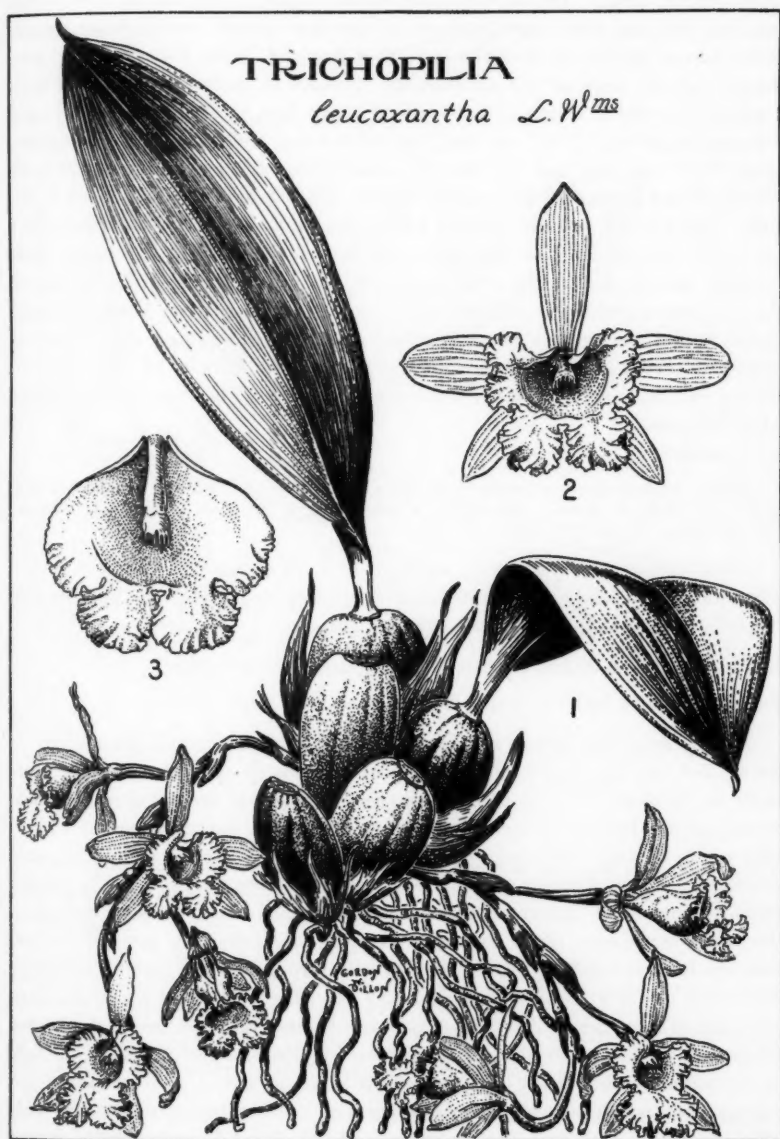
widely spreading, often twisted, usually subequal and free, the laterals sometimes connate at the base, rarely as far as the middle. Petals subequal to the dorsal sepal. Lip entire or 3-lobed, clawed at the base and adnate to the base of the column, the limb spreading or the lateral lobes convolute and forming a tube, the mid-lobe spreading, the disk smooth or lamellate. Column erect, semiterete, the margins of the apex projecting, entire or lobed, usually dentate or fimbriate, the base of the column without a foot. Anther terminal within the clinandrium, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of tropical American epiphytes ranging from southern Mexico to Peru, Brazil, and the West Indies. It is another of the frequently recurring and perplexing instances in which the specific concepts within the genus are by no means of equal value. In this case there are several groups of closely related entities, each group centering on an archetypal species, and more closely related to it, and each to the other, than to other similar groups within the genus. For example, *Trichopilia subulata* is obviously closely allied to, if not actually identical with *T. mutica*; and both markedly distinct from the archetype *T. suavis*, and its associate *T. leucoxantha*, or from the archetype *T. tortilis*, with its closely allied species *T. marginata*, *T. maculata*, *T. turialbae*, *T. Galeottiana*, etc. Due to the lack, in most instances, of types or adequate series upon which to base comparative studies, I hesitate at this time to undertake any such wholesale overhauling of names as would seem to be required on the basis of probable relationships. The present treatment, for the most part, follows established usage, but it is to be expected that many of these minor concepts may ultimately be reduced to varietal status or synonymy. At the present time six separable specific concepts are represented in Panama.

- a. Pseudobulbs subcylindric. Leaves fleshy, narrowly linear to semiterete, 10 mm. wide or less. Lip not tubular..... 5. *T. SUBULATA*
- aa. Pseudobulbs ancipitous, linear to suborbicular. Leaves coriaceous to subcoriaceous, ligular to elliptic-lanceolate, 15 mm. wide or more. Lip tubular.
- b. Pseudobulbs linear, usually more than 4 times as long as broad.
 - c. Lateral sepals connate to about the middle..... 6. *T. TURIALBAE*
 - cc. Lateral sepals not connate at the base..... 3. *T. MARGINATA*
- bb. Pseudobulbs elliptic-oblong to suborbicular, less than 3 times as long as broad.
 - c. Leaves 2-3.5 cm. wide. Basal imbricating bracts of the pseudobulbs conspicuously maculate. Scapes 1-flowered, the inner lip with an inconspicuous keel not equaling the column in length..... 2. *T. MACULATA*
 - cc. Leaves 4-7 cm. wide. Basal imbricating bracts of the pseudobulbs not maculate. Scapes several-flowered, the inner lip with a prominent central keel equaling or exceeding the column in length.
 - d. Sepals 2.5-3.5 cm. long..... 1. *T. LEUCOXANTHA*
 - dd. Sepals 4-6 cm. long..... 4. *T. SUAVIS*

1. *TRICHOPILIA LEUCOXANTHA* L. Wms. in Am. Orch. Soc. Bull. 10:137. 1941.

Erect, epiphytic herbs 20-25 cm. tall, with approximate, elliptic-oblong to suborbicular, compressed, monophyllous pseudobulbs 2.5-4.5 cm. long and 2-3.5 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which

Fig. 188. *Trichopilia leucoxantha*

soon weather away. Leaves elliptic-lanceolate, acute, subcoriaceous, 15–20 cm. long and 4–6 cm. wide, contracted at the base into a short, conduplicate petiole. Inflorescences arching or pendulous, 1- to 4-flowered scapes 5–7 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size, white with a pale yellow blotch at the base of the lip. Sepals free, spreading, the dorsal sepal oblanceolate, acute, 2.5–3.5 cm. long and 0.7–0.8 cm. wide, the laterals lanceolate, acute, 2.5–3 cm. long and 0.6–0.8 cm. wide. Petals subequal to the dorsal sepal, elliptic-oblong, obtuse with a minute apicule, 2.5–3.2 cm. long and 0.9–1.0 cm. wide. Lip 3-lobed, broadly obovate when spread out, 3–3.5 cm. long and 3–3.5 cm. wide, the narrow base adnate to the base of the column, the lateral lobes rounded, incurving over the column, the anterior margins more or less undulant, the mid-lobe spreading or reflexed, deeply emarginate, the lateral lobules strongly undulate, the disk with a prominent central keel about equaling the column in length. Column slender, terete, 15–18 mm. long, the margins of the apex projecting and forming a fimbriate hood over the anther, the base of the column without a foot.

Panama.

COCLÉ: western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 515*; vicinity El Valle de Antón, 600–1000 m., *Allen 2401, 3564*; floor of El Valle, 600 m., *Fairchild s. n.*

Thus far known only from the region of El Valle de Antón, in Coclé Province. The plants considerably resemble those of *Trichopilia suavis*, and may possibly represent only a small-flowered variety of that species.

2. *TRICHOPILIA MACULATA* Rchb. f. in Bonplandia 3:215. 1855.

Trichopilia Powellii Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:77. 1922.

Dwarf, epiphytic herbs; pseudobulbs elliptic-oblong, strongly ancipitous, 1-leaved, 2–5 cm. long and 1.5–2.5 cm. wide, approximate and inserted at an acute angle on the short rhizome, the bases enveloped in several densely spotted, imbricating, papery bracts. Leaves elliptic-lanceolate, acute, subcoriaceous, 5–12 cm. long and 2–3.5 cm. wide. Inflorescences usually solitary, slender, arching or semipendulous 1-flowered scapes 4–6 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals subequal, free, widely spreading, lanceolate, acuminate, often somewhat twisted, pale yellow or greenish yellow, 3–4 cm. long and 0.35–0.5 cm. wide. Petals subequal to the sepals, lanceolate, acuminate, pale or greenish yellow, about 3.5 cm. long and 0.5–0.6 cm. wide, often with undulant margins. Lip obscurely 3-lobed, obovate when spread out, about 3.5 cm. long and 1.6–1.8 cm. wide, contracted at the base and adnate to the base of the column, white, aging pale yellow, the inner lip yellow with numerous fine orange-red lines, the rounded lateral margins convolute, forming a tube, the mid-lobe emarginate, with spreading or reflexed lobules, the disk with a short, inconspicuous, central keel not equaling the column in length. Column slender,

Fig. 189. *Trichopilia maculata*

semiterete, the margins of the apex distinctly 3-parted and minutely denticulate, forming a hood over the anther.

Panama.

CANAL ZONE: vicinity Salamanca Hydrographic Station, upper Madden Lake region, 70-80 m., Dodge, Steyermark & Allen s. n.; Balboa, sea level, Powell 3422; drowned forest along Río Chagres, Madden Lake region, 66 m., Steyermark & Allen 16770; Barro Colorado Island, Gatún Lake, Shattuck 555; San Jose Island, Perlas Archipelago, Johnston 148, 1276. PANAMÁ: hills near Panama City, Powell 3096; Orange River valley, 75 m., Killip 3247; vicinity La Chorrera, 20 m., Allen 2842; Río La Maestra, 0-25 m., Allen 51.

Small, but attractive plants fairly frequent in the lowlands of the central and eastern Isthmian area. The species apparently is confined to Panama. Guatemalan specimens identified as this species seem more readily referable to the Mexican *T. tortilis*.

3. *TRICHOPILOIA MARGINATA* Henfr. in Gard. Mag. Bot. 3:185. 1851.*Trichopilia coccinea* Warscz. in Paxton's Flow. Gard. 2:79. 1851-52.*Trichopilia crispa* Lindl. in Gard. Chron. 342. 1857.*Trichopilia lepida* Hort. ex Flor. Mag. n. s. t. 98. 1874.

Erect, epiphytic herbs with approximate, linear, broadly truncate, strongly ancipitous, 1-leaved pseudobulbs 6-14 cm. long and 1-2.5 cm. wide, the bases enveloped in several imbricating, papery, usually conspicuously maculate sheaths. Leaves elliptic-lanceolate to lanceolate, acute to acuminate, coriaceous, 12-30 cm. long and 3-5.5 cm. wide, contracted at the base into very short, conduplicate petioles. Inflorescences short, arching or pendulous, 2- to 3-flowered scapes produced from the bases of the pseudobulbs. Flowers large and conspicuous, very variable in color, most frequently with the sepals and petals reddish with lighter margins, the lip usually white on the outer surface, rarely red, the inner tube a deep rose-red, the reflexed margins of the mid-lobe often margined white. Sepals narrow, subequal, free, widely spreading, lanceolate to oblanceolate, acute, usually not twisted but sometimes with undulant margins, 4.5-6 cm. long and 0.6-1.0 cm. wide. Petals subequal to the sepals, spreading, oblanceolate, acute, 4-5.5 cm. long and 0.8-1.2 cm. wide, often with undulant margins. Lip tubular at the base, the apex obovate when spread out, 5-8 cm. long and 4-5 cm. wide, the narrow base adnate to the base of the column, the lateral lobes rounded and convolute forming a tube, the mid-lobe deeply emarginate, the lateral lobules spreading or recurved, with undulant margins, the disk without a prominent keel. Column terete, the margins of the apex projecting, forming an obscurely 3-lobed, fimbriate hood over the anther.

Guatemala, Costa Rica, Panama, and Colombia.

CHIRIQUÍ: Caldera River flats, 3800 ft., *Powell* 3333; without definite locality, 4000 ft., *Powell* 154, 3291; forests around El Boquete, 1000-1300 m., *Pittier* 2969; in heavy forest along road below El Hato, s. w. slopes of Chiriquí Volcano, 3800 ft., *Allen* s. n.

A large-flowered, attractive species first collected by von Warszewicz in 1849 on the slopes of Chiriquí volcano and introduced into cultivation under the name of *Trichopilia coccinea*. The plants are fairly common in heavy forest at 3500-5500 ft. elevation, growing usually in dense shade on the lower trunks of the trees. They are strikingly similar to the earlier *T. tortilis* of Mexico and Guatemala, and it seems very probable that our plants represent at most a somewhat more robust variety of that species.

There are several well-marked color forms, of which the following are recorded from Panama.

TRICHOPILOIA MARGINATA var. *ALBA* Rchb. f.

Flowers pure white, the inner lip lemon-yellow.

TRICHOPILOIA MARGINATA var. *LEPIDA* Veitch, Man. Orchid. Pl. 2^o:183. 1893.

Flowers somewhat larger than in the type; the sepals and petals blotched rose-

pink, as is also the frontal lobe of the lip; the sepals and petals with very broad white margins.



Fig. 190. *Trichopilia suavis*

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TRICHOPILIA MARGINATA var. *OLIVACEA* Rchb. f. Beitr. Orch. Centr.-Amer. 13. 1866.

Sepals and petals olive-green.

4. *TRICHOPILIA SUAVIS* Lindl. & Paxton in Paxton's Flow. Gard. 1:44. 1850-51.

Trichopilia Kienastiana Rchb. f. in Gard. Chron. n. s. 20:166. 1883.

Erect, epiphytic herbs with approximate, rather fleshy, oblong-ovoid, elliptic or suborbicular, laterally compressed, monophyllous pseudobulbs 3.5-8 cm. long and 2.5-6 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which soon weather away. Leaves elliptic-lanceolate, acute, subcoriaceous, 10-40 cm. long and 3.5-8 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences short, arching or pendulous, 2- to 5-flowered scapes produced from the bases of the pseudobulbs. Flowers large and attractive, fragrant, the sepals and petals white or creamy white sometimes spotted with pale rose-pink or red, the lip white or creamy white usually heavily spotted rose-pink, the inner tube most frequently with yellow or orange markings, very rarely blotched red. Sepals subequal, free, widely spreading, usually with undulate margins, lanceolate, acute, with a central thickened nerve or keel on the dorsal surface, 3-5.5 cm. long and 0.6-1.0 cm. wide, the lateral sepals rarely somewhat connate at the very base. Petals subequal to the sepals, lanceolate, shortly acute, with undulate margins, 2.8-5 cm. long and 0.8-1.2 cm. wide. Lip tubular, 3-lobed, obovate when spread out, 4.5-6.5 cm. long and 3-5 cm. wide, the narrow base adnate to the base of the column, the rounded lateral lobes convolute forming a tube, the anterior margins usually crisped and undulate, the mid-lobe retuse or emarginate, the lobules undulate, crisped and reflexed, the disk with a prominent, erect, central keel exceeding the column in length. Column elongate, terete, the margins of the apex projecting, forming a conspicuous, fimbriate, obscurely 4-lobed hood over the anther.

Costa Rica, Panama, and Colombia.

CHIRIQUÍ: without definite locality, 4000-5500 ft., Powell 135, 3334, 3342, 3348; Llanos on southwest slope of Chiriquí Volcano and along Río Chiriquí Viejo, 1200 m., Allen 912.

This is one of the most attractive species of the genus. It was first discovered by von Warscewicz in 1848, very probably in Costa Rica; but by far the finest forms have been found on the slopes of Chiriquí volcano in Panama, where they are fairly common in low mossy woods at 3800-5500 ft. elevation. The fragrant flowers are variable in color, a pure white form being rather frequent. They are usually produced in March and April.

5. *TRICHOPILIA SUBULATA* (Sw.) Rchb. f. in Flora 48:278. 1865.

Epidendrum subulatum Sw. Prodr. 123. 1788.

Cymbidium subulatum Sw. in Nov. Act. Soc. Upsal. 6:73. 1799.

Leucobyle Warscewiczii Kl. in Ind. Sem. Hort. Bot. Berol. App. 1. 1854.

Fig. 191. *Trichopilia subulata*

Trichopilia hymenantha Rchb. f. in Bonplandia 2:90. 1854.

Trichopilia jamaicensis Fawc. & Rendle, in Jour. Bot. 48:107. 1910.

Leucobyle subulata (Sw.) Schltr. Die Orchideen, 469. 1914.

Small, caespitose, epiphytic herbs 10–25 cm. tall, with short, inconspicuous, approximate, subcylindric, monophyllous pseudobulbs 1–2.5 cm. long and 0.2–0.5 cm. wide, the bases enveloped in several brown, papery, imbricating sheaths. Leaves fleshy, linear-lanceolate to semiterete, acuminate, 9–22 cm. long and 0.3–1.0 cm. wide, contracted at the base and apparently continuous with the apices of the slender pseudobulbs. Inflorescences pendulous, unbranched racemes 2.5–6 cm. long, produced from the bases of the foliaceous stems. Flowers small for the genus, usually 3–8, on slender pedicels, each subtended by a broad, acute to acuminate, spatheous, papery bract. Sepals subequal, free, spreading, pure white to pale yellow, linear-lanceolate, acuminate, 20–23 mm. long and 3–4 mm. wide.

Petals subequal to the sepals, spreading, linear-lanceolate, acuminate, pure white to pale yellow, 18–20 mm. long and 2.5–3 mm. wide. Lip entire to obscurely 3-lobed, concave, obovate to elliptic-oblong, abruptly acute, or obtuse and apiculate, the margins minutely denticulate to conspicuously lacerate, white, usually irregularly spotted rose-purple, 15–20 mm. long and 12–18 mm. wide, the base adnate to the base of the column, the lateral margins erect at the very base and somewhat incurving over the column, the limb spreading, the disk with a short, fleshy, bifid or bicarinate callus. Column semiterete, 7–9 mm. long, the margins of the apex projecting, forming an entire, denticulate to fimbriate hood over the anther, the sides of the clinandrium below the hood with a pair of short to elongate, denticulate processes.

Panama, Colombia, and Jamaica.

CANAL ZONE: Barro Colorado Island, Wheeler trail, *Shattuck* 548; Upper Chagres River, sea level, *Powell* 241; Cerro Campana, vicinity Campana, 3000 ft., *Allen* 5142. COCLÉ: hills north of El Valle de Antón, 1000 m., *Fairchild* s. n.

Small but attractive epiphytes, vegetatively reminiscent of a slender form of *Brassavola nodosa*. The flowers in the specimens examined are quite variable. In the El Valle and Cerro Campana collections the margins of the lip are conspicuously lacerate while in the lowland specimens they are only minutely denticulate; also, the lateral subulate processes on either side of the clinandrium have been found to be quite variable, scarcely any two specimens being exactly alike. The simpler of these forms very closely approximate the earlier South American *Trichopilia mutica*, and it seems quite probable that a more complete series of collections from the intermediate area would prove the two concepts to be one polymorphic species.

6. *TRICHOPILIA TURIALBAE* Rchb. f. in Hamb. Gartenzeit. 19:11. 1863, non Batem.

Erect, epiphytic herbs with approximate, linear, strongly ancipitous pseudobulbs 5.5–10 cm. tall and 1.2–1.8 cm. wide, the truncate apices with a single leaf, the bases of the pseudobulbs enveloped in several papery, imbricating bracts. Leaves elliptic-lanceolate, acute, subcoriaceous, 15–20 cm. long and 3.5–5 cm. wide. Inflorescences short, arching or pendulous, 1- to 3-flowered scapes produced from the bases of the pseudobulbs. Flowers of moderate size. Sepals spreading, pure white, 2.5–3 cm. long and 0.4–0.5 cm. wide, the dorsal sepal free, lanceolate, acute, the lateral sepals connate to about the middle, acuminate. Petals subequal to the dorsal sepal, pure white, lanceolate, acuminate, 2.5–3 cm. long and 0.6–0.8 cm. wide. Lip tubular, white with pale orange lines in the throat, obscurely 3-lobed, obovate when spread out, 3.5–4 cm. long and 2.5–3 cm. wide, the narrowed base adnate to the base of the column, the lateral margins convolute and enveloping the column, the mid-lobe retuse at the apex, the lateral lobules reflexed and undulate, the disk with an elongate, central keel exceeding the length of the

column. Column elongate, semiterete, the margins of the apex projecting and forming a distinctly 3-parted, minutely denticulate hood over the anther.

Costa Rica and Panama.

VERAGUAS: mountains of western Azuero, about 600 m., E. R. Dunn s. n.

Trichopilia turialbae Rchb. f. is very close to the earlier *T. tortilis*, differing in the smaller size and in color of the flowers, and in the conspicuously connate lateral sepals. However, several Guatemalan collections of *T. tortilis* have been examined in which the flowers closely approximate ours in size. In all the material seen of *T. tortilis*, the lateral sepals were found to be connate at the base in some degree, although none to the middle as in our specimens. It seems rather likely, however, that intermediate forms will eventually be found and that *T. turialbae* will be reduced to varietal status under the archetypal species.

73. MESOSPINIDIUM Rchb. f.

MESOSPINIDIUM Rchb. f. in Bot. Zeit. 10:929. 1852; Walp. Ann. 6:856. 1864.

Epiphytic herbs with slender, complanate, monophyllous pseudobulbs enveloped at the base in several conspicuous, foliaceous bracts. Leaves at the apex of the pseudobulbs and the blades of the foliaceous bracts ligular to elliptic-lanceolate, subcoriaceous to pergameneous, the conduplicate, imbricating bases of the foliaceous bracts forming a 2-ranked, more or less flabelliform cluster. Inflorescences slender, erect or arching panicles or racemes produced from the base of the current pseudobulb. Flowers small, on short, slender pedicels subtended by inconspicuous bracts. Sepals rather fleshy, not widely spreading, the dorsal sepal free, the laterals connate for more than half their length, forming a single bifid segment supporting the lip. Petals oblong, acute to cuneate and aristate, the broad bases inserted on the sides of the column. Lip entire, the base shallowly subsaccate and continuous with the base of the column, the limb oblong, obovate or subpandurate, the margins usually revolute, the apex acute to obtuse and emarginate, the disk with 2 fleshy, converging keels. Column short, very stout, apparently without wings or appendages, the base without a foot; pollinia 2, waxy.

Two or three species of tropical American epiphytes, apparently closely allied to *Oncidium* and *Odontoglossum*. One species is known from Panama.

1. MESOSPINIDIUM WARSCEWICZII Rchb. f. in Bot. Zeit. 10:929. 1852.

Solenidium Endresii Kränzl. in Engl. Pflanzenr. IV, Fam. 50 (Heft 80):317. 1922.

Erect, epiphytic herbs with distichous clusters of foliaceous bracts, the conduplicate bases somewhat enveloping a slender, strongly ancipitous, nearly linear, monophyllous pseudobulb, the plants 12-22 cm. tall. Leaves of the apex of the pseudobulbs and the blades of the foliaceous bracts ligular to elliptic-lanceolate, acute to acuminate, pergameneous, 5-17 cm. long and 1-2.8 cm. wide, contracted below into slender, conduplicate petioles, the persistent bases of the bracts often somewhat broader than the petioles, in dried specimens superficially resembling

the pseudobulbs. Inflorescences 1-2 slender, erect, racemose or paniculate scapes equaling or exceeding the leaves, 12-27 cm. tall, produced from the bases of the pseudobulbs. Flowers small. Sepals rather fleshy, not widely spreading, greenish yellow to tan, often spotted reddish brown, the dorsal sepal ovate, deeply concave, the apex conspicuously aristate, 6-8 mm. long and 2.5-3 mm. wide, the lateral sepals connate for more than half their length, forming a single bifid segment supporting the lip, 6-8 mm. long and 4-5 mm. wide. Petals rather fleshy, oblong-lanceolate, the apices aristate, the broad bases inserted on the sides of the column, the margins scarcely imbricating with those of the sepals, 4-5 mm. long and 2.5-3 mm. wide. Lip fleshy, entire, subpandurate when spread out, 5-7 mm. long and 2.5-3 mm. wide, white to pale yellow, usually with minute red spots, the oblong, subsaccate base continuous with the base of the column, the apex broader, with revolute margins, the disk with 2 converging fleshy keels. Column short, very stout, apparently without wings or appendages, about 4 mm. long and 4 mm. wide, the base without a foot.

Costa Rica and Panama.

PANAMÁ: Cerro Campana, vicinity Campana, in cloud forest near summit, 800-1000 m., *Allen* 3966. COCLÉ: vicinity El Valle de Antón, 650 m., *Fairchild* s. n.; hills north of El Valle de Antón, 1000 m., *Allen* 2761, 2785.

74. ODONTOGLOSSUM HBK.

ODONTOGLOSSUM HBK. Nov. Gen. & Sp. 1:350, *t.* 85. 1816; Benth. & Hook. Gen. Pl. 3:561. 1883.

Cuitlauzina La Llave & Lex. Nov. Veg. Descr. 2:32. 1825.

Cuitlanzina Lindl. Orch. Sel. 15. 1826.

Cuitlauzinia Rchb. Nom. 54. 1841.

Lichterveldia Lem. Illustr. Hort. 2: *t.* 59. 1855.

Osmoglossum Schltr. in Orchis 10:162. 1916, as subgenus.

Epiphytic herbs with approximate or rarely distant, usually ovoid or elliptic-oblong, compressed, 1- to 3-leaved pseudobulbs, the bases enveloped in a few distichous, papery or foliaceous bracts. Leaves coriaceous or fleshy. Inflorescences produced from the bases of the pseudobulbs, sometimes short and 1-flowered, more frequently elongate, erect or arching, very rarely pendulous, few- to many-flowered racemes or panicles. Flowers usually large and conspicuous, but sometimes small. Sepals subequal, usually spreading, free or rarely with the lateral sepals united. Petals usually subequal to the dorsal sepal but sometimes broader. Lip 3-lobed or entire, the base continuous with the base of the column, the limb erect or parallel with the column, sometimes shortly adnate to it, the lateral lobes (if present) spreading or erect, the mid-lobe usually deflexed, less frequently spreading or concave, the apex acute, obtuse or emarginate, the disk at the base of the lip variously cristate, denticulate, lamellate, or rarely smooth. Column usually longer and more slender than in *Oncidium*, often clavate, the apex without appendages or sometimes with the margins produced into lobes, auricles, or teeth. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A large, polymorphic group of highland epiphytes having centers of rich specific and varietal development in the mountains of Mexico and Colombia, with some species ranging as far south as Brazil and Bolivia. As has been pointed out by Dr. Louis Williams in a footnote to the generic key (Ann. Mo. Bot. Gard. 33:7 [Fl. Pan. 3²:113]. 1946) the concepts of *Odontoglossum*, *Miltonia*, *Mesospinidium*, *Aspasia*, *Brassia*, *Leocbilus*, and *Osmoglossum* are technically inseparable from that of the earlier *Oncidium*, and might much more logically be treated as subgeneric sections of that genus. However, the species in each category are generally sufficiently distinctive to be readily recognizable by the average amateur, only the border-line species presenting any great difficulty. Practical ends seem to be better served by the maintenance of these entities as distinct, particularly for a treatment of this type, with the single exception of *Osmoglossum*, which, it appears, was never properly described or published, having been listed by Schlechter merely as a subgenus. Five species have been known from Panama, and a sixth, *Odontoglossum convallarioides*, which is very common in the highlands of adjacent Costa Rica, may possibly be represented in our series of specimens by a single fragmentary collection.

- a. Apex of the pseudobulbs monophyllous.
 - b. Inflorescences racemose. Plants robust, the pseudobulbs distantly inserted on an elongate rhizome..... 2. *O. CHIRIQUENSE*
 - bb. Inflorescences 1-flowered. Plants dwarf, the pseudobulbs approximate..... 5. *O. OERSTEDII*
- aa. Apex of the pseudobulbs di- or triphyllous.
 - b. Inflorescences paniculate..... 1. *O. CARINIFERUM*
 - bb. Inflorescences racemose.
 - c. Flowers small, sepals 15 mm. long or less. Leaves narrowly linear.
 - d. Lateral sepals connate for more than half their length..... 4. *O. EGERTONI*
 - dd. Lateral sepals not connate..... 3. *O. CONVALLARIOIDES*
 - cc. Flowers large, sepals 30 mm. long or more. Leaves elliptic-lanceolate..... 6. *O. SCHLIEPERIANUM*

1. *ODONTOGLOSSUM CARINIFERUM* Rchb. f. in Bot. Zeit. 10:638. 1852.

Oncidium cariniferum (Rchb. f.) Beer, Prakt. Stud. Orch. 283. 1854.

Odontoglossum hastilabium Lindl. var. *fuscatum* Hook. in Bot. Mag. t. 4919. 1856.

Large, erect, epiphytic herbs with ovoid to elliptic-oblong, compressed, usually furrowed pseudobulbs 6–12 cm. long and 2.5–8 cm. wide, the apices with 2–3 leaves, the bases partially enveloped in several more or less distichous, imbricating bracts, the upper 2–3 of which are conspicuously foliaceous. Leaves coriaceous, linear-ligular, acute, 30–45 cm. long and 2.5–7 cm. wide. Inflorescences large, stout, erect or arching, many-flowered panicles, conspicuously exceeding the leaves, up to about 1 m. in length. Flowers relatively large, on long, slender pedicels, each subtended by an inconspicuous bract. Sepals subequal, usually free, spreading, brown, usually with yellow tips and margins, lanceolate, acuminate, somewhat concave, with a strongly developed dorsal keel, 2.5–3 cm. long and 0.4–0.6 cm. wide. Petals subequal to the sepals and similarly colored, lanceolate, acuminate, sometimes subfalcately incurving, 2–2.5 cm. long and 0.6–0.8 cm.

wide. Lip inconspicuously 3-lobed, 2–2.2 cm. long and 2–2.2 cm. wide, the much narrower basal half elliptic-oblong, adnate to the base of the column, the narrow lateral margins erect or spreading, the mid-lobe broadly biauriculate, white aging pale yellow, the apex very shortly acute or shallowly emarginate, with a short central apicule, the disk at the base of the lip often stained red, with 2 lateral subfalcate wings, the center with several projecting, fleshy teeth. Column slender, erect, about 10 mm. long, the ventral surface of the lower half conspicuously thickened, with 2 obscure lateral keels, terminating in 2 short, acute, fleshy wings below the stigma.

Costa Rica, Panama, Venezuela, and probably adjacent areas.

CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell 142, Kieswetter s. n.*; vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 7000 ft., *Allen 1517*.

A robust species much resembling an *Oncidium* in vegetative habit, found in our area in Chiriquí Province, at 4000–7000 ft. elevation, where the plants seem to be confined to the tops of the tallest forest trees.

2. *ODONTOGLOSSUM CHIRIQUENSE* Rchb. f. in Bot. Zeit. 10:692. 1852.

Oncidium chiriquense (Rchb. f.) Beer, Prakt. Stud. Orch. 283. 1854.

Odontoglossum coronarium Lindl. Fol. Orch. Odontog. (21) No. 60. 1852.

Oncidium coronarium (Lindl.) Beer, Prakt. Stud. Orch. 285. 1854.

Robust, epiphytic herbs with stout, elongate, repent or semi-scandent rhizomes, the oblong-ovoid, compressed, monophyllous, usually dull purple pseudobulbs 7–11 cm. long and 4–6 cm. broad, distantly and obliquely inserted on the stems, the bases freely rooting, provided with 2–3 lateral, conspicuously foliaceous bracts, the long internodes completely enveloped in numerous papery, imbricating sheaths. Leaves and the blades of the foliaceous bracts elliptic-oblong, obtuse or retuse, coriaceous, 15–30 cm. long and 6–9 cm. wide, contracted at the base into short, conduplicate petioles. Inflorescences stout, erect, many-flowered racemes 30–45 cm. long. Flowers large and conspicuous, bright yellow richly blotched with reddish brown. Sepals free, subequal, widely spreading, elliptic-oblong to obovate, obtuse, with strongly undulate margins, 2–3 cm. long and 1.6–2 cm. wide. Petals subequal to the sepals and similarly colored, elliptic-oblong to obovate, obtuse to subacute, with strongly undulate margins, 2–3 cm. long and 1.5–1.8 cm. wide. Lip 3-lobed, subpandurate, 1.8–2.5 cm. long, the basal half conspicuously narrower than the apex and shortly adnate to the base of the column, the small lateral lobes erect, rather obliquely auriculate, obtuse, with undulate margins, the mid-lobe broadly spreading or reflexed, obovate, the apex obtuse or emarginate, the disk tuberculate at the base. Column short, stout, somewhat arcuate, 8–10 mm. long, the margins of the apex membranaceous and spreading.

Costa Rica, Panama, Colombia, Peru, and probably adjacent territories.

VERAGUAS: "Wild in Veragua; on the Cordillera of Chiriquí, at the height of 9000 ft., on decayed tree trunks. Flowers in October." *von Warczewicz*.

The type collection of this large-flowered and handsome species was presumably made in Panama, but it has not been found in recent years in our area, although it is fairly well known from adjacent Costa Rica and Colombia. It is often listed in horticultural publications as a variety of *Odontoglossum coronarium*. The reason for such treatment is a bit obscure, since Lindley, on the page following the type description of the latter species (*Folia Orchidaceae*. *Odontog.* (22) No. 62. 1852), cites the place and date of the prior publication of *O. chiriquense*.

3. *ODONTOGLOSSUM CONVALLARIOIDES* (Schltr.) Ames & Correll, in Bot. Mus. Lafl. Harv. Univ. 11:19. 1943.

Osmoglossum convallarioides Schltr. in Fedde, Rep. Sp. Nov. Beih. 19:148. 1923.

Slender, erect, epiphytic herbs 30–45 cm. tall, the plants nearly identical with those of *Odontoglossum Egertoni*. Flowers fragrant, white, sometimes tinged with pink or lavender, the disk of the lip usually yellow. Sepals free, subequal, somewhat spreading, elliptic-oblong, acute or subacute, concave, 7–10 mm. long and 3–6 mm. wide. Petals broader than the sepals, obovate to suborbicular, obtuse or minutely apiculate, 6–9 mm. long and 5–7 mm. wide. Lip obscurely 3-lobed, obovate, the apex subacute to obtuse or emarginate, 8–10 mm. long and 6–8 mm. wide, the lateral lobules spreading or semi-erect, the mid-lobe usually concave, the disk with two short keels, produced at the front into 2 erect, incurving, parallel, approximate, denticulate processes, the central area below the base of the column with a low, narrow, cuneate callus. Column short, very stout, about 3 mm. long and 3 mm. wide, the apex with obscure, subentire, membranaceous lobules surrounding the clinandrium, the base without a foot.

Mexico, Guatemala, Honduras, Costa Rica, and probably Panama.

A widespread Central American highland species, very closely allied to *Odontoglossum pulchellum*, but differing in the much smaller flowers, the concave rather than arcuate-deflexed lip, and in the less conspicuous lobules surrounding the clinandrium. Although there are no authentic records to substantiate its occurrence in Panama, one fragmentary collection (*Woodson, Allen & Seibert 875*) looks rather suspiciously like it, and in any event its frequent occurrence in the adjacent Costa Rican highlands would strengthen the probability that it will ultimately be found in Chiriquí.

4. *ODONTOGLOSSUM EGERTONI* Lindl. in Bot. Reg. n. s. 8: Misc. 50. 1845.

Osmoglossum Egertoni (Lindl.) Schltr. in Orchis 10:166. 1916, in synon.

Osmoglossum acuminatum Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:79. 1922.

Osmoglossum anceps Schltr. loc. cit. 19:147. 1923.

Erect, epiphytic herbs with approximate, narrowly elliptic-oblong or ovoid, tapering, compressed, often ridged, 2- to 3-leaved pseudobulbs 3.5–10 cm. long and 1.5–2.2 cm. wide, the bases partially enveloped in 2–3 distichous, conspicuously foliaceous bracts. Leaves and the blades of the basal bracts usually rather rigidly erect, narrowly linear-ligular, acute or acuminate, coriaceous, 25–45 cm.

long and 0.8–1.5 cm. wide. Inflorescences erect, few-flowered racemes, usually not equaling the leaves, produced from the bases of the pseudobulbs, 20–30 cm. tall, the rachis conspicuously flattened, provided with a few, distant, complanate, conduplicate, acuminate bracts. Flowers small for the genus, white, the disk of the lip yellow with reddish spots. Sepals not widely spreading, lanceolate to elliptic-lanceolate, acute to shortly acuminate, concave, the dorsal sepal free, 1.2–1.5 cm. long and 0.4–0.6 cm. wide, the laterals united to beyond the middle, forming a single bifid segment below the lip, 1.3–1.5 cm. long and 0.6–0.8 cm. wide. Petals rather oblique, subequal to the dorsal sepal, ovate-elliptic, acute or shortly acuminate, 1–1.3 cm. long and 0.5–0.8 cm. wide. Lip entire, elliptic-oblong, acute or shortly acuminate, 10–12 mm. long and 6–7 mm. wide, somewhat concave or spreading, the apex sometimes reflexed, the disk with two low keels converging at the front and produced into 2 erect, parallel, fleshy teeth, the central area below the base of the column with a low, narrow, cuneate callus. Column very short, stout, 2–3 mm. long and 2–3 mm. wide, the apex with short, membranaceous, 3-parted, fimbriate to denticulate projections surrounding the clinandrium.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 6000 ft., Powell 255.

Our specimens have somewhat narrower sepals and petals, and a somewhat more acuminate lip than in the type, but otherwise do not differ in the presence or absence of any essential character. It seems possible that all of the species of this alliance will ultimately be reduced to sub-specific rank or synonymy under the two distinctive archetypes, *O. pulchellum* and *O. Egertoni*.

5. *ODONTOGLOSSUM* OERSTEDII Rchb. f. in Bonplandia 3:214. 1855.

Dwarf, erect, epiphytic herbs up to 22 cm. tall, with approximate, ovoid, usually somewhat compressed, monophyllous pseudobulbs 1–3 cm. long and 0.8–1.8 cm. wide, the bases enveloped in several thin, papery, imbricating, non-foliaceous bracts which soon weather away. Leaves linear-ligular to elliptic-lanceolate, acute, coriaceous, 5–18 cm. long and 0.8–3 cm. wide, contracted below into elongate, slender, conduplicate petioles. Inflorescences erect, slender, 1-flowered scapes equaling or exceeding the leaves, 5–15 cm. long, produced from the bases of the pseudobulbs. Flowers of moderate size, solitary, white, fragrant, the base of the lip with a golden-yellow blotch, the callus densely spotted orange. Sepals free, subequal, spreading, elliptic-oblong, obtuse to subacute, sometimes with a short apicule, 12–20 mm. long and 6–10 mm. wide. Petals subequal to the sepals or sometimes broader, oblong-obovate to elliptic-oblong, obtuse, 12–20 mm. long and 8–12 mm. wide. Lip obovate, shortly clawed at the base, the narrow claw adnate to the base of the column, the apex of the lip broadly spreading, deeply emarginate and 2-lobed, 1.5–2.5 cm. long and 1.5–2.5 cm. wide, the disk with a short, erect, subquadrate, bicarinate, fleshy callus, the center concave, the posterior margin



Fig. 192. *Odontoglossum Schlieperianum*

directly below the column minutely ciliate. Column short, stout, 5–7 mm. long, without wings or appendages, the base without a foot.

Costa Rica and Panama.

CHIRIQUÍ: Potrero Muleto to the summit of Chiriquí Volcano, 3500–4000 m., Woodson & Schery 455; Loma Larga to the summit, 2500–3380 m., Woodson, Allen & Seibert 1030; Casita Alta to Cerro Copete, 2300–3300 m., Woodson & Schery 337; without definite locality, 10,000 ft., Davidson 1001; summit of Cerro Copete, on dead branches in Ericaceous barrens, 9000 ft., Allen 4905.

A small but attractive species rather frequent on the highest slopes of Chiriquí Volcano at 7,000–10,000 ft. elevation. Descriptions in horticultural publications usually indicate that the scapes are 2- to 5-flowered, yet none of the fairly extensive series of specimens in the Ames Herbarium show this to be the case, all having solitary flowers, which has also been the writer's observation in the field in the Chiriquí highlands and in Costa Rica. It seems possible that the plant illustrated in the 'Botanical Magazine' (t. 6820) under the name of *Odontoglossum Oerstedii* may be a white-flowered form of *O. Krameri*.

6. *ODONTOGLOSSUM SCHLIEPERIANUM* Rchb. f. in Gard. Chron. 1082. 1865.

Odontoglossum Insleayi Bark. var. *macranthum* Lindl. Fol. Orch. Odontog. (4). 1852.

Odontoglossum Warszewiczii Bridges ex Stein, Orchideenb. 398. 1892.

Odontoglossum Powellii Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:78. 1922.

Odontoglossum grande Lindl. var. *pallidum* Hort. ex. Sanders, Orchid Guide 313. 1927.

Erect, epiphytic or sometimes pseudoterrestrial herbs with approximate, fleshy, elliptic-oblong or ovoid, compressed, centrally ridged, grayish green, diphyllous pseudobulbs 4–12 cm. long and 2.5–5.5 cm. wide, the bases enveloped in several thin, papery, imbricating bracts which soon weather away. Leaves lanceolate to elliptic-lanceolate, acute, subcoriaceous, 10–30 cm. long and 3–7 cm. wide, contracted below into short or elongate, conduplicate petioles. Inflorescences stout, erect, 2- to 8-flowered racemes equaling or exceeding the leaves, 18–35 cm. long, produced from the bases of the pseudobulbs. Flowers large, yellow or greenish yellow, conspicuously barred and blotched with reddish brown. Sepals subequal, free, spreading, lanceolate, acuminate, 3–4.5 cm. long and 1–1.5 cm. wide. Petals broader than the sepals, oblong-ob lanceolate, obtuse to subacute, 3–3.5 cm. long and 1.5–2 cm. wide. Lip obscurely 3-lobed, subpandurate when spread out, 2–3 cm. long and 1.0–1.5 cm. wide, the base contracted into a narrow claw which is adnate to the base of the column, the lateral lobes small, rounded or suborbicular, erect in natural position, the mid-lobe spatulate to obovate, obtuse or retuse, about $\frac{3}{4}$ the total length of the lip, the disk with a short, central keel, from the mid-section and apex of which are produced 2 pairs of short, spreading, fleshy auricles. Column short, about 10 mm. long, terete below, dilated above, with a slender, acuminate, incurving tooth on each side of the stigma.

Costa Rica and Panama.

CHIRIQUÍ: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500-2000 m., Woodson, Allen & Seibert 790; vicinity Boquete, 3800-5500 ft., Pring s. n., Davidson 797; without definite locality, "In gulch, in damp shady places," 3800 ft., Powell 178; valley of the upper Río Chiriquí Viejo, 1300-1900 m., Seibert 227; vicinity Paso Ancho, Bambito Woods, along Río Chiriquí Viejo, 4500-5000 ft., Allen 54.

A common species of the Chiriquí highlands, closely allied to *Odontoglossum grande* of Mexico and Guatemala.

75. ASPASIA Lindley

ASPASIA Lindl. Gen. & Spec. Orch. Pl. 139. 1833; Benth. & Hook. Gen. Pl. 3:560. 1883.

Trophianthus Scheidw. in Otto & Dietr. Allg. Gartenzeit. 12:218. 1844.

Epiphytic herbs with short, erect, approximate, usually complanate, cylindric stems conspicuously thickened above into compressed, 1- to 2-leaved pseudobulbs, the lower stems and bases of the pseudobulbs invested by the conduplicate, distichously imbricating bases of several conspicuous, foliaceous bracts. Leaves and bract blades coriaceous or subcoriaceous. Inflorescences 1-2 short, erect, few-flowered racemes or rarely 1-flowered scapes, not equaling the leaves, produced from the axils of the uppermost foliaceous bracts. Flowers relatively large to small. Sepals of about equal length, spreading, the dorsal sepal subequal to the petals, the bases of the 3 upper segments connivent and adnate to the column usually somewhat above the insertion of the free lateral sepals. Lip shortly and narrowly clawed at the base, the claw adnate to the lower half of the column, the free limb spreading or with the apical half somewhat correct, obscurely 3-lobed, subpandurate, subquadrate, suborbicular or obovate, sometimes entire, the lateral lobes (if present) rather broad, subdistinct or confluent with the usually larger mid-lobe. Column erect, semiterete, sometimes somewhat arcuate, the lower half connate with the claw of the lip, the ventral surface below the stigma broadly or narrowly sulcate, the margins sometimes with 2 short, denticulate projections, the apex truncate or sometimes continued into a short membranaceous hood over the anther, the column otherwise wingless, the base without a foot. Anther terminal, operculate, incumbent, 2-celled; pollinia 2, waxy.

About ten species of tropical American epiphytes, ranging from Guatemala to Brazil. Two of these and one variety are thus far known from Panama.

- | | |
|---|---|
| a. Pseudobulbs monophyllous. Plants 25 cm. tall or less. Column less than 6 mm. long..... | 3. A. PUSILLA |
| aa. Pseudobulbs diphyllous. Plants more than 25 cm. tall. Column 1.5 cm. long or more. | |
| b. Lateral sepals 1.5-2.2 cm. long, with broad transverse markings. Column with an elliptic depression below the stigma. Apical half of the lip correct..... | 1. A. EPIDENDROIDES |
| bb. Lateral sepals 2.5 cm. long or more, with narrow longitudinal stripes. Column with a narrow linear groove below the stigma. Apical half of the lip not correct..... | 2. A. EPIDENDROIDES
var. PRINCIPISSA |



Fig. 193. *Aspasia epidendroides*

(500)

1. *ASPASIA EPIDENDROIDES* Lindl. in Hook. Jour. Bot. 1:6. 1834.*Aspasia fragrans* Kl. Ind. Sem. Hort. Bot. Berol. 12. 1852.*Odontoglossum Aspasia* Rchb. f. in Walp. Ann. 6:851. 1861.

Erect, epiphytic herbs with linear to oblong-elliptic, laterally compressed, diphyllous, stipitate pseudobulbs 5–14 cm. long and 2–6 cm. wide, the more robust plants having one side of the pseudobulb flattened, while the other surface is conspicuously convex, the complanate-cylindric lower portions and bases of the pseudobulbs invested with several closely imbricating bracts, the uppermost 2–3 of which are distichously arranged and conspicuously foliaceous. Leaves lanceolate to ligular, acute, subcoriaceous, 10–28 cm. long and 1.5–5 cm. wide. Inflorescences 1–2 simple, erect, few-flowered racemes 9–25 cm. long. Flowers of moderate size, the sepals greenish with broad transverse bands of brown or brownish lavender, the petals pale lavender to greenish brown, the lip white, with conspicuous purple or lavender markings in the center, the disk yellow, the column and anther tinged with lavender. Sepals of about equal length, elliptic-obovate, shortly acute, the apex concave with a short fleshy apiculate keel or thickening on the dorsal surface, 1.3–2 cm. long and 0.7–1.0 cm. wide, the base adnate to the base of the column slightly above the insertion of the petals, the lateral sepals strongly reflexed, narrowly and somewhat obliquely oblanceolate, acute, 1.5–2.2 cm. long and 0.6–0.8 cm. wide, the dorsal surfaces thickened into short apiculate keels at the apices. Petals subequal to the dorsal sepal, elliptic-obovate, concave, 1.5–1.8 cm. long and 0.6–0.9 cm. wide, the apices thickened into short, acute keels on the dorsal surfaces. Lip clawed at the base, the claw adnate to the lower half of the column, the free limb abruptly deflexed, obscurely 3-lobed, subquadrate, 1.2–1.6 cm. long and 1.4–1.8 cm. wide, the basal and apical halves of about equal width, the lateral margins at the base spreading, the mid-lobe emarginate and 2-lobed, with a thickened central keel, usually more or less porrect, the disk with 2 narrow parallel keels about equaling the lateral lobes of the lip in length. Column semiterete, slightly arcuate, about 1.5 cm. long, with a narrowly elliptic concavity below the stigma.

Guatemala, Honduras, Nicaragua, Costa Rica, and Panama.

PANAMÁ: along road to Pacora, about 50 m., *Allen 822*. COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 633*; Penonomé and vicinity, 50–1000 ft., *R. S. Williams 445*. VERAGUAS: vicinity Santiago, 600–800 ft., *Powell 3542*; vicinity Río de Jesús, sea level, *Allen & Allen 4273*. CHIRIQUÍ: without definite locality, *Powell 3017*.

2. *ASPASIA EPIDENDROIDES* var. *PRINCIPISSA* (Rchb. f.) P. H. Allen, stat. nov.*Aspasia principissa* Rchb. f. in Bot. Zeit. 10:367. 1852.*Aspasia Rousseauae* Schltr. in Gartenfl. 71:76. 1922.

Epiphytic herbs often nearly identical to *Aspasia epidendroides*, but usually somewhat less robust and with larger flowers. Sepals subequal, spreading, lanceolate, acute to acuminate, pale green, longitudinally striped brown, the apices thickened and somewhat concave, usually 2.5–3 cm. long and 0.5–0.7 cm. wide,



Fig. 194. *Aspasia epidendroides* var. *principissa*

the dorsal sepal connivent at the base with the bases of the petals and adnate to the column somewhat above the insertion of the lateral sepals. Petals a little broader than the sepals, spreading, lanceolate, acute, 2.2–2.8 cm. long and 0.6–0.9 cm. wide. Lip narrowly clawed at the base, the claw adnate to the lower half of the column, the free limb abruptly deflexed, explanate, obscurely 3-lobed, subpandurate, 2–3 cm. long and 1.8–2.6 cm. wide, the basal half usually conspicuously broader than the apical half, the lateral lobes rounded and spreading, the mid-lobe emarginate, the lateral lobules somewhat undulate but never porrect, the disk with numerous radiating thickened nerves, the central 2 of

which are parallel and exceeding the others, about equaling the lateral lobes of the lip in length. Column semiterete, lightly arcuate, 1.8–2 cm. long, creamy white aging pale yellow, adnate to the claw of the lip for about half of its length, the ventral surface below the stigma with a narrow groove, the base of the column without a foot.

Costa Rica and Panama.

CANAL ZONE: wet forest bordering Gatún Lake, 30 m., Killip 3447; Culebra, 50–100 m., Pittier 3396; Cruces, sea level, Powell 3108. PANAMÁ: foothills near Panama City, sea level, Powell 39; Juan Díaz, sea level, Powell 3038; Chiva-Chiva, sea level, Powell 3029; Río La Maestra, Pacific coast between the Río Bayano and the Gulf of San Miguel, 0–25 m., Allen 68; San Jose Island, Perlas Archipelago, Johnston 136, 702, 1015, 1288, Erlanson 199. COLÓN: Quebrada Salamanca, upper Madden Lake region, 70 m., Dodge, Steyermark & Allen 16990; forests along the Río Boquerón, above the Peluca Hydrographic Station, 90 m., Hunter & Allen 653; Río Viejo, vicinity Puerto Pilón, sea level, Allen 4252. DARIÉN: forests around Yaviza, Pittier 6581; vicinity Marraganti, 10–200 ft., R. S. Williams 969.

An attractive, large-flowered variety of *Aspasia epidendroides*, usually confined to areas of higher rainfall, being known from the vicinity of Puerto Limón, on the Atlantic coast of Costa Rica, and ranging eastward along the Atlantic seaboard, probably as far as Colombia. In the Canal Zone area, it follows the Río Chagres drainage to the headwaters of Madden Lake, crossing to the Pacific slope in the forested hills east of Panama City and continuing into Darién Province and the Perlas Islands, replacing the typical form from the Canal area eastward.

3. *ASPASIA PUSILLA* C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 10:21, t. 1. 1941.

Small, erect, epiphytic herbs with approximate, linear or ellipsoid-complanate, monophyllous pseudobulbs 2.5–4 cm. long and 1.0–1.5 cm. wide, the complanate-cylindric, stipitate bases invested by several distichously imbricating, conduplicate sheaths the upper 2–3 of which are conspicuously foliaceous and enveloping the lower portions of the pseudobulbs. Leaves linear-ligular, obliquely acute, subcoriaceous, up to 17 cm. long and 1.5 cm. wide, contracted below into short conduplicate petioles. Inflorescences slender, erect, few-flowered racemes up to about 8 cm. long. Flowers small for the genus, on long slender pedicels, the sepals and petals yellow to greenish yellow with a dark brown basal blotch, the lip white or pale yellow, the disk orange marked with mauve or maroon stripes. Sepals subequal, free, spreading, the dorsal sepal elliptic-lanceolate to oblanceolate, acute, about 13 mm. long and 4.5 mm. wide, the laterals lanceolate, acute, about 13.5 mm. long and 4 mm. wide. Petals subequal to the dorsal sepal, elliptic-oblanceolate, obliquely acute, about 12 mm. long and 4 mm. wide. Lip clawed at the base, the claw adnate to the lower half of the column, the free limb suborbicular to obovate, entire, about 11 mm. long and 12 mm. wide, the apex slightly retuse, broadly spreading, the base somewhat concave, the disk with a short pubescent, divaricate callus. Column very short, stout, about 5.5 mm. long, the apex with a denticulate

Fig. 195. *Aspasia pusilla*

hood over the anther, the lateral margins below the stigma with 2 short, porrect, obliquely triangular teeth.

Costa Rica and Panama.

DARIÉN: Cana-Cuasi trail, hills near Chepigana, 2000 ft., *Terry & Terry 1502*.

A very distinctive dwarf species, known in our area only from the type collection.

76. *BRASSIA* R. Brown

BRASSIA R. Br. in Ait. Hort. Kew. 2:215. 1813; Benth. & Hook. Gen. Pl. 3:564. 1883.

Erect, epiphytic herbs with short stems usually thickened into conspicuous pseudobulbs that are infrequently rudimentary and inconspicuous or rarely entirely absent, the 1-3 leaves at the apex enveloped in several foliaceous or papery bracts, the conduplicate leaf bases distichously imbricating and forming a broad or narrow fan. Inflorescences 1-2 erect or arching, few- to many-flowered racemes produced from the bases of the pseudobulbs or concurrently with the flush of new growth, or, if the plants are pseudobulbless, from the axils of the leaves. Flowers usually large and conspicuous, subtended by small and inconspicuous, or elongate spathaceous bracts. Sepals free, spreading, narrowly acuminate or caudate, sometimes of about equal length but more frequently with the lateral sepals conspicuously longer. Petals subequal to the dorsal sepal or smaller. Lip entire or obscurely 3-lobed, spreading, shorter than the sepals, the base sessile and adnate to the base of the column, the disk usually bilamellate. Column short, erect, without wings or appendages, the clinandrium scarcely prominent, usually truncate. Anther terminal, operculate, incumbent, 1-celled or imperfectly 2-celled; pollinia 2, waxy.

A small genus of American epiphytes, ranging from southern Florida and the West Indies to Mexico, Central America, and northern South America to Brazil, Bolivia, and Peru. They are technically inseparable from *Oncidium*, yet the majority of the species can readily be distinguished by the conspicuously elongate lateral sepals. Five species are known from Panama.

- a. Plants without pseudobulbs, or apparently so.
 - b. Leaves many, forming a broad fan, entirely without pseudobulbs.
 - Lateral sepals 3.5 cm. long or more..... 1. *B. ALLENI*
 - bb. Leaves few, forming a narrow distichous petiole, usually enveloping a small rudimentary pseudobulb. Lateral sepals 2 cm. long or less..... 3. *B. CHLOROPS*
- aa. Plants without conspicuous pseudobulbs.
 - b. Lateral sepals 2 cm. long or less..... 3. *B. CHLOROPS*
 - bb. Lateral sepals 3 cm. long or more.
 - c. Pseudobulbs monophyllous at the apex..... 5. *B. LONGISSIMA*
 - cc. Pseudobulbs diphyllous or rarely triphyllous at the apex.
 - d. Apical half of the lip conspicuously broader than the basal half. Calli thickened into broad plates at the front. Highland species..... 4. *B. GIREOUDIANA*
 - dd. Apical half of the lip not conspicuously broader than the basal half. Calli at the front with 2 separate and distinct slender teeth. Lowland species..... 2. *B. CAUDATA*

1. *BRASSIA ALLENII* L. O. Wms. ex C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 13:145, *t.* 12. 1948.

Erect, epiphytic herbs entirely without pseudobulbs, the plants 30–38 cm. tall, nearly identical in vegetative appearance with *Huntleya meleagris*. Leaves 8–14, distichously arranged in the form of a broad fan, linear-ligular to lanceolate, usually shortly and subfalcately acuminate, subcoriaceous, 15–35 cm. long and 2–4 cm. wide, the conduplicate bases 2-ranked and closely imbricating, usually slightly broader at the suture line than the leaf petioles. Inflorescences erect or arching, 5- to 8-flowered, congested racemes $\frac{1}{2}$ to $\frac{2}{3}$ the length of the leaves. Flowers of moderate size, the lip usually uppermost in natural position, very fragrant, subtended by broad, acute or acuminate, papery, spathaceous bracts. Sepals subequal, free, spreading, reddish tan to olive-ocher, shading to cinnamon-buff at the base, linear-lanceolate, long-acuminate, 3.5–4 cm. long and 0.4–0.5 cm. wide. Petals subequal to the sepals and similarly colored, with a small triangular barium-yellow spot at the base, obliquely lanceolate, long-acuminate, the attenuate apices subfalcately incurving, 3–4 cm. long and 0.5–0.6 cm. wide. Lip entire, subquadrate to suborbicular, spreading, slightly convex, 15–20 mm. long and 13–16 mm. wide, barium-yellow, with a narrow, semicircular band of Mikado brown spots surrounding the disk, the base sessile and adnate to the base of the column, the apex abruptly contracted into an elongate, acuminate apicule, the disk white, with 2 short, stout, erect, parallel, strontian yellow keels, terminating at the front in 2 short, obtuse, subconic teeth. Column very short, stout, terete, about 5 mm. long, green or white, with 2 lateral Mikado brown blotches, without wings or appendages, the base without a foot.

Panama.

PANAMÁ: cloud forest on summit of Cerro Campana, 3000 ft., Allen & Fairchild 5150. COCLÉ: mountains beyond La Pintada, 400–600 m., Hunter & Allen 592; hills north of El Valle de Antón, 800–1000 m., Fairchild s. n., Oblson s. n., Allen 374, 2830, 2922, 3717.

A very distinctive species entirely without pseudobulbs, apparently most nearly allied to *Brassia glumacea* Lindl. of Venezuela. The plants are nearly identical in superficial appearance with those of *Huntleya meleagris*, sometimes differing in the shortly and subfalcately acuminate apices of the leaves, and in the conduplicate leaf bases which are often rather noticeably dilated at the suture line and not uninterruptedly confluent with the leaf petioles, as in the latter. All specimens seen have originated in the cool wet forests north of El Valle de Antón, the cloud forest cap of Cerro Campana, or in the mountains west of Santa Fé, in Veraguas; the only presently accessible areas in Panama representative of the extensive and poorly known intermediate highlands of the Atlantic slope.

2. *BRASSIA CAUDATA* (L.) Lindl. in Bot. Reg. 10: *t.* 832. 1824.

Epidendrum caudatum L. Sp. Pl. ed 2, 1349. 1763.

Malaxis caudata Willd. Sp. Pl. 4:93. 1805.

Oncidium caudatum Rchb. f. in Walp. Ann. 6:766. 1863.

Fig. 196. *Brassia Allenii*

(507)

Brassia Lewisii Rolfe, in Orch. Rev. 1:199. 1893.

Brassia longissima (Rchb. f.) Schltr. var. *minor* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:80. 1922.



Fig. 197. *Brassia caudata*

Erect, epiphytic herbs with approximate, linear to oblong-elliptic, ancipitous pseudobulbs 6–15 cm. long and 2–4 cm. wide, the truncate apices usually with 2 or rarely with 3 leaves, the bases of the pseudobulbs enveloped in 4–6 papery, closely imbricating bracts, the uppermost sometimes foliaceous. Leaves ligular to elliptic-oblong, obtuse to shortly acute, coriaceous, 16–27 cm. long and 2.5–6 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2 arching, unbranched, usually 6- to 12-flowered racemes 15–30 cm. long, produced from the lateral bases of the pseudobulbs, the rachis often dull red, often rather complanate. Flowers large, with conspicuous caudate lateral sepals. Sepals free, spreading, greenish yellow to yellow, usually spotted reddish brown, particularly near the base, the dorsal sepal erect, linear-lanceolate, long-attenuate, 4–9 cm. long and 0.4–0.7 cm. wide, the apical half usually incurving, the lateral sepals conspicuously longer, caudate, of quite variable length, 12–30 cm. long and 0.5–0.6 cm. wide at the base, the outer surfaces with a strongly developed central keel. Petals free, greenish yellow or yellow, usually heavily spotted reddish brown near the base, the long attenuate apices falcately incurving, 2–3 cm. long and 0.3–0.4 cm. wide. Lip entire, oblong-lanceolate, long-acuminate, somewhat convex, often with deflexed lateral margins, yellow with reddish brown markings at the base, 3–5 cm. long and 1.0–1.2 cm. wide, the base sessile and adnate to the base of the column, the disk with 2 erect parallel lamellae in front of which are 2 short, distinct, acute teeth. Column stout, 4–5 mm. long, without wings or appendages, the base without a foot.

Mexico to Brazil and Bolivia; Florida; Greater Antilles.

CANAL ZONE: Miraflores, *Powell* 3231; Frijoles, *Powell* 3117, 3256, *Killip* 3448; Pedro Miguel, *Powell* 3258, 3530, 3566; Ancón, *Pittier* 6631; Barro Colorado Island, Gatún Lake, *Shattuck* 202. PANAMA: hills east of Panama City, *Powell* 3275, *Allen* 4560. DARIÉN: vicinity La Palma, 0–50 m., *Pittier* 6619. CHIRIQUÍ: exact locality lacking, sea level, *Powell* 87.

A very common and widely distributed species of the lowlands of the American tropics and subtropics. The flowers are somewhat variable in size, those with the longest sepals sometimes being confused with *Brassia longissima*, a very different species with monophyllous pseudobulbs, of the cool intermediate highland forests of the Atlantic slope. *Brassia longissima* var. *minor* is simply a small-flowered form of *B. caudata*.

3. *BRASSIA CHLOROPS* Endres & Rehb. f. in Gard. Chron. 542. 1873.

Brassia parviflora A. & S. in Sched. Orch. 8:74. 1925.

Erect, caespitose, epiphytic herbs usually with slender, complanate-elliptic, rudimentary, monophyllous pseudobulbs often completely enveloped by the conduplicate leaf bases. Leaves lanceolate, shortly acuminate, subcoriaceous, 8–30 cm. long and 1.4–3.0 cm. wide, the conduplicate bases distichously imbricating, often forming a short, narrow, complanate petiole, the leaves toward the base becoming progressively shorter, the lowest reduced to non-foliaceous bracts. In-

florescences erect, 3- to 7-flowered racemes 15–25 cm. long, produced from the axils of the upper leaves. Flowers very small for the genus. Sepals rather fleshy, free, subequal, spreading, linear-lanceolate, acuminate, 1.4–2 cm. long and 0.2–0.3 cm. wide. Petals subequal to the dorsal sepal, obliquely lanceolate, acuminate, 1.1–1.5 cm. long and 0.15–0.25 cm. wide. Lip entire, rather fleshy, elliptic-lanceolate to linear-lanceolate, acute, 1–1.1 cm. long and about 0.45 cm. wide, the apex usually dorsally carinate and recurved, the base adnate to the base of the column, the disk with 2 fleshy parallel pubescent keels, about $\frac{1}{2}$ the total length of the lip, the apices terminating in 2 more or less prominent teeth. Column short, stout, about 5 mm. long, the base without a foot.

Costa Rica and Panama.

CHIRIQUI: vicinity Casita Alta, Finca Lérica, eastern slopes of Chiriquí Volcano, 1500–2000 m., Woodson, Allen & Seibert 874.

An aberrant highland species, having the aspect of a small-flowered *Odontoglossum*. It differs from most species of *Brassia* in the short sepals which are of about equal length, green with darker spots or brown with yellow markings. Our single specimen differs in color, and somewhat in structural detail from the type, but seems more readily referable to this species than to any other.

4. *BRASSIA GIREOUDIANA* Rchb. f. & Warscz. in Otto & Dietr. Allg. Gartenzeit. 22:273. 1854.

Oncidium Gireoudianum Rchb. f. in Walp. Ann. 6:768. 1863.

Erect, epiphytic herbs with approximate, fleshy, elliptic-ovoid, rather compressed, usually longitudinally ridged, diphyllous pseudobulbs 7–11 cm. long and 2.5–4 cm. wide, the bases enveloped in several papery, imbricating bracts the uppermost 1–2 of which are sometimes foliaceous. Leaves ligular to lanceolate, acute, coriaceous, 22–35 cm. long and 2–5 cm. wide, the bases contracted into short conduplicate petioles. Inflorescences usually solitary, elongate, arching, many-flowered racemes equaling or exceeding the leaves, usually produced concurrently with the flush of new growth from the axils of the expanding leaves or sometimes from the bases of the newly completed pseudobulbs. Flowers large and conspicuous, with elongate filiform sepals and petals. Sepals free, widely spreading, long-attenuate, greenish yellow with a few brown blotches near the base, the dorsal sepal narrowly linear-lanceolate, 9–10 cm. long and 0.3–0.4 cm. wide near the base, the lateral sepals somewhat longer, narrowly linear-lanceolate, 10–15 cm. long and 0.4–0.5 cm. wide near the base. Petals subequal to the dorsal sepal, spreading, the apical half greenish yellow, the basal half brown, narrowly linear-lanceolate, long-attenuate, 5–6 mm. long and 3–4 mm. wide near the base. Lip entire, rather rhombic in outline, 3–4.5 cm. long and 1.5–2.5 cm. wide, pale yellow with sparse brown spots and blotches, the basal portion subquadrate to oblong, adnate to the base of the column, the apical portion abruptly dilated and cordate, shortly acuminate or apiculate, the disk with 2 fleshy, minutely puberulent

keels, the basal portions erect and parallel, terminating at the apex in 2 larger subquadrate spreading lobules. Column very short, stout, 3.5–5 mm. long, the base without a foot.

Costa Rica and Panama.

CHIRIQÚI: "On banks of rivers", 3500–4500 ft., *Powell 143*; Llano del Volcán, and along Río Chiriquí Viejo, 1200 m., *Allen 915*.

5. *BRASSIA LONGISSIMA* (Rchb. f.) Nash in Bailey, Stand. Cyclop. Hort. 1:541. March, 1914.

Brassia Lawrenceana Lindl. var. *longissima* Rchb. f. in Gard. Chron. 1313. 1868.

Brassia longissima (Rchb. f.) Schltr. Die Orchideen, 496. October 1914, as to basynym, but only in part as to plant described.

Erect, epiphytic herbs with approximate, very strongly flattened, oblong to elliptic-oblong, monophyllous pseudobulbs, with very thin, acute margins, 4–16 cm. long and 3–5 cm. wide, the bases enveloped in several conduplicate, imbricating, papery bracts, the uppermost one of which is usually shortly foliaceous. Leaves oblong-lanceolate, acute, coriaceous, 25–55 cm. long and 4–7 cm. wide, the bases contracted into very short, conduplicate petioles. Inflorescences 1 or rarely 2, arching, few-to many-flowered racemes 25–45 cm. long, produced from the bases of the pseudobulbs. Flowers large and conspicuous, with elongate, filiform, lateral sepals. Sepals yellow to greenish yellow, spotted or blotched reddish brown near the base, the dorsal sepal narrowly linear-lanceolate, long-attenuate, 8–10 mm. long and 3–4 mm. wide at the base, the lateral sepals conspicuously longer, narrowly linear-lanceolate, caudate, 10–18 cm. long and 0.3–0.4 cm. wide. Petals shorter than the dorsal sepal, yellow to greenish yellow, reddish brown near the base, narrowly linear-lanceolate, the attenuate apices subfalcately incurving, 4–5 cm. long and 0.3–0.4 cm. wide at the base. Lip entire, pale yellow to greenish white, with sparse reddish brown spots near the base, lanceolate, acuminate, 3–5 cm. long and 1.0–1.5 cm. wide, the base somewhat concave with erect margins, adnate to the base of the column, the disk with an erect, fleshy, minutely puberulent, bilamellate, obliquely truncate callus. Column short, semiterete, about 8 mm. long, the base without a foot.

Costa Rica, Panama, Peru, and probably adjacent territories.

COCLÉ: region north of El Valle de Antón, 1000 m., *Fairchild s. n.*; Loma del Tigre, hills north of El Valle, 3000 ft., *Allen 4562*.

This very distinctive species has thus far been found only twice in Panama, both times in the wet highland forests north of El Valle de Antón, in Coclé Province, at about 3000 ft. elevation, although the species is to be expected generally in similar areas on the Atlantic slope.

Since there seems to be some confusion in regard to the application of the name *Brassia longissima*, it might be well to give something of its history. Both

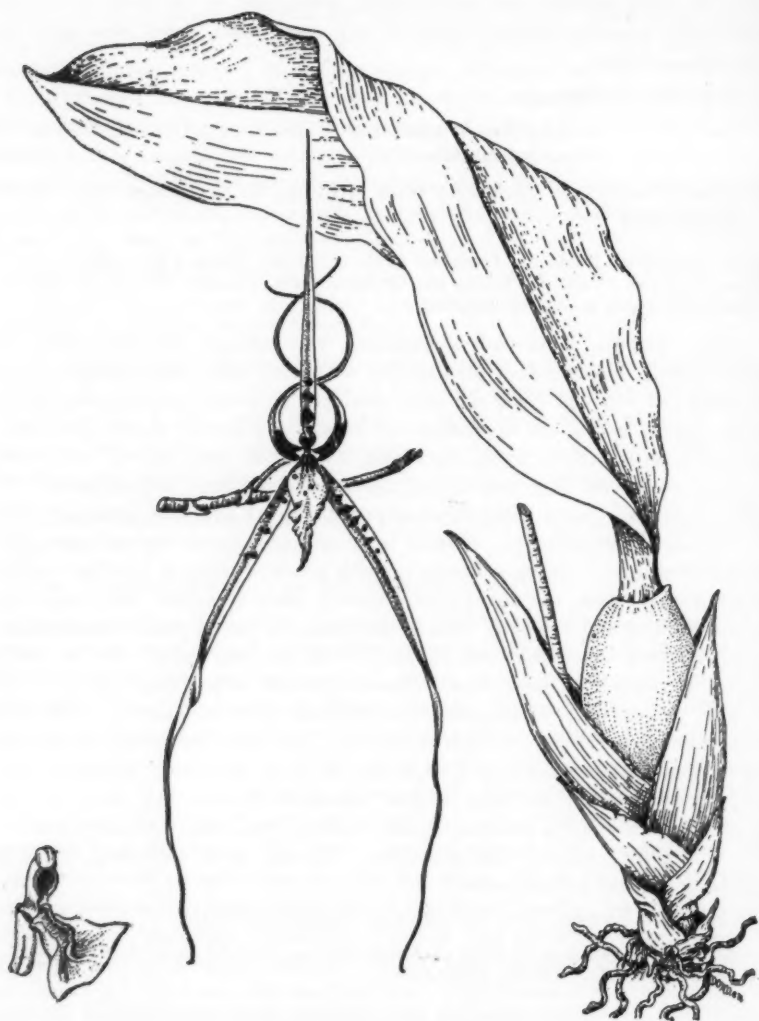


Fig. 198. *Brassia longissima*

Nash (in Bailey Stand. Cyclop. Hort. 1:541. March, 1914) and Schlechter (Die Orchideen, 496. October, 1914) decided that the entity hitherto known as *Brassia Lawrenceana* Lindl. var. *longissima* Rchb. f. actually represented a distinct species, citing Reichenbach's variety as the name-bringing synonym. The

accompanying description given by Nash, whose publication antedated that of Schlechter by some six months, essentially followed Reichenbach's original, while that of Schlechter was apparently based on two distinct elements: the Reichenbach variety of *B. Laurenciana*, and a very different plant that we now know was a large-flowered form of *B. caudata* (Powell 87). Although under the rules, the name of *B. longissima* (Rchb. f.) Schltr. must be regarded as synonymous with the name-bringing synonym, or the first published derivative name therefrom, there can be no doubt that the plant which Schlechter had in mind was a large-flowered form of *B. caudata*. This is further borne out by his subsequent description of another, smaller-flowered form of *B. caudata* under the name of *B. longissima* var. *minor* (in Fedde Rep. Sp. Nov. Beih. 17:80. 1922).

77. MILTONIA Lindl.

MILTONIA Lindl. in Bot. Reg. 23: sub t. 1976. 1837; Benth. & Hook. Gen. Pl. 3:563. 1883.

? *Gynizodon* Raf. Fl. Tellur. 4:40. 1836.

Macrobilus Knowles & Westcott, Fl. Cab. 1:93, t. 45. 1837.

Epiphytic herbs, with short, usually rather inconspicuous, compressed pseudobulbs bearing 1-2 leaves at the apex, the base enveloped in few to many distichous, imbricating, conspicuously foliaceous bracts. Leaves and bract blades elliptic-lanceolate to narrowly linear, coriaceous to subcoriaceous, contracted at the base into short or elongate conduplicate petioles. Inflorescences axillary from the base of the pseudobulb, often short, erect or arching, 1- to few-flowered scapes or sometimes elongate, many-flowered racemes. Flowers relatively large and conspicuous, on long slender pedicels subtended by elongate, spathaceous, or sometimes minute and inconspicuous bracts, the perianth segments and the lip usually being all on one plane so that the flowers are typically flat. Sepals subequal, spreading, free, or the laterals very shortly connate at the base. Petals subequal to the sepals or a little broader. Lip entire, broadly spreading, the apex often bifid, the base sessile or very shortly and broadly clawed and affixed to the base of the column usually at a right angle, the disk inconspicuously or sometimes prominently lamellate. Column short, the apex or anterior portion variously 2-auriculate or 2-alate, the clinandrium short, truncate, or the apex 2-lobed, or sometimes membranaceous and dilated, 2- to 3-lobed, the base without a foot. Anther terminal, operculate, incumbent, 1- or imperfectly 2-celled; pollinia 2, waxy.

About 20 species of attractive, mostly highland epiphytes closely allied to *Oncidium* and *Odontoglossum*, having centers of development in the mountains of Colombia and southern Brazil, with a single species known from as far north as Costa Rica.

1. MILTONIA ENDRESII Nichols. in Dict. Gard. 2:368. 1888.

Odontoglossum Warscewiczii Rchb. f. in Bot. Zeit. 10:692. 1852.

Miltonia superba Schltr. in Fedde Rep. Sp. Nov. 3:249. 1907.

Erect, caespitose, epiphytic herbs with distichous, foliaceous stems 16–38 cm. tall, the conduplicate, imbricating leaf bases enveloping a small complanate, elliptic-oblong, monophyllous pseudobulb 3–5 cm. tall and 1.2–1.5 cm. wide. Leaves narrowly linear to lanceolate, obliquely acute to acuminate, coriaceous, the blades 12–30 cm. long and 1–2.5 cm. wide, contracted below into short or elongate conduplicate petioles. Inflorescences 1 or 2 erect or arching, 2- to 5-flowered racemes 15–30 cm. long, produced from the lateral bases of the pseudobulbs. Flowers large and conspicuous, on elongate pedicels, white with a rose-purple blotch at the base of the perianth segments and two blotches at the base of the lip, or sometimes entirely white with a golden yellow disk. Sepals broadly ovate, the laterals acute, the dorsal sepal usually obtuse with a minute apicule, 2.5–3 cm. long and 1–1.5 cm. wide. Petals a little broader than the sepals, spreading, elliptic-obovate, obtuse or minutely apiculate, about 2.5 cm. long and 1.2–1.6 cm. wide. Lip entire, broadly panduriform, 3–3.5 cm. long and 2.5–4 cm. wide, the apex broadly emarginate and 2-lobed, sometimes with a minute central mucro, the base of the lip with a very short, broad claw which is affixed at right angles to the base of the column, the disk with 3 short, fleshy, obtuse, puberulent keels. Column stout, 4–5 mm. long, the apex dilated, nearly wingless.

Costa Rica and Panama.

CHIRIQUÍ: trail from Paso Ancho to Monte Lirio, upper valley of the Rio Chiriquí Viejo, 1500–2000 m., Allen 1508.

An attractive highland species, often forming clumps in the tops of the tallest forest trees. Our specimens have pure white flowers, with a yellow disk, and narrower leaves than in the Costa Rican material, but otherwise seem to be identical. Mr. Walter Cope, of Pedro Miguel, reports that *Miltonia Roezlii* Nichols., a lowland species of the Colombian Choco, has been found in the upper Madden Lake region.

78. ONCIDIUM Swartz

ONCIDIUM Sw. in Vet. Akad. Nya Handl. Stockh. 21:239. 1800; Lindl. Folia Orch. Oncidium, (1). 1855; Benth. & Hook. Gen. Pl. 3:562. 1883.

? *Phadrosanthus* Neck. Elem. 3:153. 1790.

Cyrtochilum HBK. Nov. Gen. & Sp. 1:349. 1815.

Cyrtochilos Spreng. Syst. Veg. 3:729. 1826.

Coppensia Dum. in Mem. Acad. Brux. 9:10. 1835, in nota.

Tolumnia Raf. Fl. Tellur. 2:101. 1836.

Xeilyathum Raf. loc. cit. 62. 1836.

Xaritonis Raf. loc. cit. 4:9. 1836.

Psychopsis Raf. loc. cit. 40. 1836.

Lopbialis Raf. loc. cit. 40. 1836.

Olgasis Raf. loc. cit. 51. 1836.

Palumbina Rchb. f. in Walp. Ann. 6:699. 1861.

Papiliopsis E. Morr. in Belg. Hort. 24:261. 1874.

Baptistonia Barb. Rodr. Gen. & Sp. Orch. Nov. 1:95. 1877.

Erect or pendulous, epiphytic or infrequently terrestrial herbs with short, foliaceous stems, most frequently thickened into conspicuous, more or less ancipitous, 1- to 2 (rarely more)-leaved pseudobulbs, the bases enveloped in several papery or foliaceous bracts, or less frequently with the pseudobulbs very short, rudimentary, cylindric, subconic, or complanate-cylindric, enveloped in several papery sheaths, or the plants rarely with many distichously equitant leaves and entirely without pseudobulbs. Leaves subcoriaceous, coriaceous or fleshy, equitant, flat, terete or triangular. Inflorescences usually 1 or 2 short or elongate, often flexuose, erect, arching or laxly pendulous, branching panicles, simple racemes, or 1-flowered scapes produced from the lateral bases of the pseudobulbs, or in the equitant-leaved species from the axils of the leaves. Flowers often large and conspicuous, usually yellow or brown. Sepals usually subequal, spreading or reflexed, free, or the laterals somewhat connate rarely nearly to the apex, the dorsal sepal rarely much longer and narrower than the laterals. Petals subequal to the dorsal sepal or sometimes larger. Lip usually 3-lobed, often pandurate, rarely nearly entire, the base shortly clawed or sessile and adnate to the base of the column, usually forming a right-angle with it, the lateral lobes porrect, spreading or reflexed, sometimes obsolete, the central portion of the lip usually with an isthmus, the mid-lobe spreading, usually very broad and transversely dilated, rarely narrow, often emarginate or bifid, the disk usually conspicuously cristate or tuberculate. Column usually short, stout, the lateral margins near the stigma with or without auriculate or petaloid projections, the clinandrium very short and truncate or ovate and obliquely erect, entire or with the apex shortly bidentate, the base footless or sometimes apparently with a short foot, rarely produced into a prominent, erect, horn-like process. Anther terminal, operculate, incumbent, strongly convex, semiglobose or cucullate, 1-celled, imperfectly or rarely 2-celled; pollinia 2, usually deeply sulcate, waxy.

A very large, polymorphic genus of often attractive, usually epiphytic American orchids ranging from Florida and Mexico to the West Indies and South America as far as Peru, Bolivia, and Brazil. Twenty-six species are thus far known from Panama.

- a. Plants without pseudobulbs, or the pseudobulbs rudimentary and inconspicuous.
- b. Leaves solitary, fleshy, from the apex of a very short subconic or subcylindric stem. Basal sheathing bracts papery.
- c. Leaves broadly lanceolate to elliptic-oblong..... 6. *O. CARTHAGINENSE*
- cc. Leaves terete.
- d. Lip more than twice as long as the lateral sepals. Basal callus occupying less than half of the total length of the isthmus.
- e. Flowers very small, the lip 1 cm. long or less, at the base with 2 separate and distinct keels ending in small tubercles on either side of the central boss..... 9. *O. EBRACHIATUM*
- ee. Flowers of moderate size, the lip 1 cm. long or more, at the base without keels or tubercles on either side of the prominent central boss..... 24. *O. STIPITATUM*
- dd. Lip less than twice as long as the lateral sepals. Basal callus very prominent, occupying nearly all of the central isthmus..... 25. *O. TERES*
- bb. Leaves many, coriaceous or subcoriaceous, the conduplicate bases

- distichously imbricating.
- c. Plants dwarf, less than 10 cm. tall.
- d. Leaves not equitant, the conduplicate bases enveloping a small pseudobulb. Peduncles filiform, not conspicuously flattened at the apex..... 8. *O. CRISTA-GALLI*
- dd. Leaves equitant, the plants entirely without pseudobulbs. Peduncles conspicuously flattened, particularly near the apex..... 22. *O. PUSILLUM*
- cc. Plants robust, more than 35 cm. tall.
- d. Base of the lip with prominent, well-developed lateral lobes..... 17. *O. OCHMATOCHILUM*
- dd. Base of the lip without prominent, well-developed lateral lobes... 19. *O. PANDURIFORME*
- aa. Plants with conspicuous pseudobulbs.
- b. Lip conspicuously exceeding the lateral sepals in length.
- c. Pseudobulbs suborbicular, about as broad as long.
- d. Pseudobulbs very distantly inserted on an elongate, slender, flexuose rhizome..... 11. *O. GLOBULIFERUM*
- dd. Pseudobulbs approximate on a short rhizome.
- e. Bracts enveloping the base of the pseudobulb foliaceous.
- f. Apex of the pseudobulb diphyllous..... 15. *O. NEBULOSUM*
- ff. Apex of the pseudobulb monophyllous.
- g. Apical leaf of the pseudobulb much reduced, conspicuously less than the bract blades in length..... 8. *O. CRISTA-GALLI*
- gg. Apical leaf of the pseudobulb about equal to the bract blades in length.
- h. Lip with a distinct rectangular isthmus..... 16. *O. OBRYZATUM*
- hh. Lip with a sharp median constriction, but without a distinct rectangular isthmus..... 7. *O. CHEIROPHORUM*
- ee. Bracts enveloping the base of the pseudobulb not foliaceous... 1. *O. AMPLIATUM*
- cc. Pseudobulbs elliptic-oblong to oblong-ovoid, usually more than twice as long as broad.
- d. Pseudobulbs monophyllous at the apex. Sepals about 5 mm. long..... 20. *O. PARVIFLORUM*
- dd. Pseudobulbs 2- to 3-leaved at the apex.
- e. Inflorescences with both normal and abortive sterile flowers.... 12. *O. HETERANTHUM*
- ee. Inflorescences with only normal fertile flowers.
- f. Sepals obovate-spatulate, broadly obtuse or truncate..... 16. *O. OBRYZATUM*
- ff. Sepals lanceolate to elliptic-lanceolate, acute to subacute.
- g. Isthmus broad, at least half the width of the mid-lobe.... 5. *O. CABAGRAE*
- gg. Isthmus narrow, usually less than $\frac{1}{4}$ the width of the mid-lobe..... 13. *O. ISTHMI*
- bb. Lip subequal to the lateral sepals or shorter.
- c. Lateral sepals connate nearly to the apex..... 26. *O. WARSCEWICZII*
- cc. Lateral sepals free, or only very shortly connate at the base.
- d. Dorsal sepal and petals elongate, linear-spatulate, very dissimilar to the broad lateral sepals. Flowers solitary, at the apex of an elongate scape..... 14. *O. KRAMERIANUM*
- dd. Sepals and petals more or less similar in shape.
- e. Floral bracts very large and conspicuous.
- f. Flowers more than 3 cm. in diameter, the mid-lobe of the lip subequal to the dorsal sepal in width..... 21. *O. POWELLII*
- ff. Flowers less than 3 cm. in diameter, the mid-lobe of the lip conspicuously exceeding the dorsal sepal in width..... 4. *O. BRACTEATUM*
- ee. Floral bracts small or slender and inconspicuous.
- f. Leaves narrowly linear-ligular, acute or acuminate. Pseudobulbs usually 2- to 3-leaved at the apex.
- g. Lower portions of the foliaceous bracts not articulated, without a suture..... 10. *O. ENSATUM*
- gg. Lower portions of the foliaceous bracts articulated, with a distinct suture.
- h. Lip with a distinct isthmus, the callus with 2 crenulate or denticulate, lateral plates at the base..... 3. *O. BAUERII*
- hh. Lip without a distinct isthmus, the callus surmounted by 4 divergent, crenulate keels..... 18. *O. PANAMENSE*
- ff. Leaves broadly lanceolate, obtuse to subacute. Pseudobulbs usually monophyllous at the apex.

- g. Lip distinctly shorter than the lateral sepals.
- h. Mid-lobe of the lip about equaling the dorsal sepal in width. Apex of the callus with a broad transverse plate..... 21. *O. POWELLII*
- hh. Mid-lobe of the lip conspicuously exceeding the dorsal sepal in width. Apex of the callus with 3 fleshy teeth.. 23. *O. STENOTIS*
- gg. Lip about equaling the lateral sepals, or somewhat longer.
- h. Pseudobulbs exceptionally thin and flattened, without prominent longitudinal ridges, the conduplicate bases of the foliaceous bracts thin and papery..... 2. *O. ANSIFERUM*
- hh. Pseudobulbs not exceptionally thin and flattened, with prominent longitudinal ridges, the conduplicate bases of the foliaceous bracts coarsely fibrous..... 3. *O. BAUERI*

1. *ONCIDIUM AMPLIATUM* Lindl. Gen. & Sp. Orch. Pl. 202. 1833.

Oncidium Bernoullianum Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):231. 1922.

Epiphytic herbs with ovoid to suborbicular, strongly compressed, or sometimes angular, pseudobulbs which are often longitudinally ridged and transversely wrinkled, 3–12 cm. tall and 3–9 cm. wide, usually flecked with red or brown, rarely entirely raisin-purple, the apex with 1–3 leaves, the base enveloped in several papery, imbricating bracts. Leaves elliptic-oblong to ligular, obtuse to subacute, coriaceous, 8–40 cm. long and 3–12 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to many-flowered racemes or panicles conspicuously exceeding the leaves in length, produced laterally from the bases of the pseudobulbs. Flowers variable in size but averaging about 2.5 cm. in diameter, bright yellow, nearly white on the reverse surfaces, the sepals spotted with reddish brown, the callus white spotted red. Sepals free, subequal, spreading, oblong-spatulate, obtuse, the dilated apices deeply concave, 6–10 mm. long and 3.5–5 mm. wide. Petals much broader than the sepals, clawed at the base, with flat suborbicular blades, 7–11 mm. long and 5–9 mm. wide. Lip very broadly spreading, 3-lobed, 1.5–2 cm. long and 2–3 cm. wide, the lateral lobes relatively small, subauriculate, obtuse, the central portion of the lip with a short constriction, the mid-lobe abruptly dilated, deeply emarginate and 2-lobed, transversely oblong or reniform, the base of the lip contracted into a short claw and adnate to the base of the column, the disk with an erect, fleshy callus, surmounted by a transverse biauriculate plate and terminating at the apex in a prominent tridentate process. Column very short, 3–4 mm. long, the apex with 3 denticulate wings, the base without a foot.

Guatemala to Peru, Venezuela, and Trinidad.

CANAL ZONE: Chagres, sea level, *Fendler 331*; near Culebra, 50–100 m., *Pittier 3397*; Cruces, sea level, *Powell 3199*; Barro Colorado Island, Gatún Lake, *Woodworth & Vestal 706*, *Sbattuck 203*; Frijoles, *Powell 3211*; McComber Hill, 300 ft., *Powell 3200*. PANAMÁ: near Bejuco, 100 ft., *G. Fairchild s. n.* COCLÉ: near La Pintada, 150 m., *Allen 3918*. VERAGUAS: Bahia Honda, *Taylor 1512*.

An attractive lowland species with bright yellow flowers, widely distributed in the American tropics. In Panama they were formerly very frequent in the Chagres River valley, and in general along streams where they were often found high on the trunks and branches of the common *Espavé* (*Anacardium excelsum*). The



Fig. 199. *Oncidium ampliatum*
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larger-flowered forms are often offered for sale under the name of *Oncidium ampliatum* var. *majus*.

2. *ONCIDIUM ANSIFERUM* Rchb. f. in Bot. Zeit. 10:696. 1852.

Oncidium ensatum Hort. ex Rchb. f. in Xenia Orch. 1:232. 1858, in synon., non Lindl.

Oncidium hieroglyphicum Hort. pro parte ex Rchb. f. loc. cit. 1858, in synon.

Oncidium Lankesteri Ames, in Sched. Orch. 4:53. 1923.

Oncidium naranjense Schltr. in Fedde Rep. Sp. Nov. Beih. 19:259. 1923.

Epiphytic herbs with very strongly compressed, exceptionally thin, ovate-elliptic or oblong-elliptic, usually smooth pseudobulbs 6–10 cm. tall and 3–6 cm. wide, the apices with 1 or infrequently 2 leaves, the bases with several distichously imbricating bracts the uppermost 2–3 of which are conspicuously foliaceous. Leaves lanceolate to elliptic-lanceolate, subacute to obtuse, pergameneous, 15–33 cm. long and 2.5–5.5 cm. wide. Inflorescences 1 or 2 erect or arching panicles, usually much exceeding the leaves, up to about 1 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, averaging about 3 cm. in diameter, the sepals and petals brown, sometimes with yellow margins and apices, the mid-lobe and lateral lobes of the lip bright yellow, the central isthmus brown with a bright yellow crest. Sepals subequal, free, spreading, elliptic-lanceolate, obtuse to acute, with strongly undulate margins, 1.2–1.7 cm. long and 0.4–0.6 cm. wide. Petals somewhat broader than the sepals, spreading, elliptic-oblong, obtuse to subacute, with undulate margins, 1.4–1.6 cm. long and 0.5–0.65 cm. wide. Lip pandurate, 3-lobed, 1.4–1.6 cm. long and 1–1.5 cm. broad at the transversely reniform, emarginate apex, the mid-section of the lip abruptly contracted in front into a broad isthmus, the basal portions more or less confluent with the short, suborbicular, lateral lobes, the disk with a 5-lobed puberulous crest, terminating in a central porrect tooth. Column short, 4–6 mm. long, the apex with dolabriform wings.

Costa Rica and Panama.

CHIRIQUÍ: Río Chiriquí Viejo, vicinity Paso Ancho, 5000 ft., *H. Dunn s. n.*; Llano del Volcán, western slopes of Chiriquí Volcano and along Río Chiriquí Viejo, 1200 m., *Allen 1011*.

An attractive highland species, readily distinguished from other Panama *Oncidium*s by the broad, smooth, exceptionally thin pseudobulbs.

3. *ONCIDIUM BAUERI* Lindl. in Bauer & Lindl. Ill. Orch. Gen. t. 7. 1830-38.

Oncidium altissimum var. β Lindl. Gen. & Spec. Orch. Pl. 200. 1833.

Epidendrum gigas L. C. Rich. ex Lindl. loc. cit. 200. 1833.

Oncidium altissimum Lindl. in Bot. Reg. 19: t. 1651. 1833, non Sw.

Oncidium polycladium Rchb. f. ex Lindl. Fol. Orch. *Oncidium*, (47). 1855.

Oncidium altissimum var. *Baueri* Stein, Orchideenb. 404. 1892.

Erect, robust, epiphytic herbs with approximate, oblong-ovoid, strongly ridged pseudobulbs up to about 18 cm. tall and 4 cm. wide, the apices with 1 or 2 leaves, the lower portions enveloped in the coarsely fibrous, conduplicate, imbricating

bases of several conspicuously foliaceous bracts. Leaves and bract blades linear-ligular, acute, subcoriaceous, up to about 75 cm. long and 2.5–4 cm. wide. Inflorescences 1 or 2 stout, erect, arching or pendulous, many-flowered panicles up to about 3 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, 2.5–3 cm. in diameter. Sepals free, subequal, spreading or reflexed, shortly clawed at the base, yellow marked with brown, the dorsal sepal elliptic-lanceolate, acute, 1–1.5 cm. long and 0.4–0.5 cm. wide, the lateral sepals obliquely linear-lanceolate, acute or shortly acuminate, the dorsal surface with a distinct central keel, 1.2–1.7 cm. long and 0.35–0.45 cm. wide. Petals subequal to the dorsal sepal and similarly colored, elliptic-lanceolate, acute, with undulate margins, 1–1.4 cm. long and about 0.5 cm. wide. Lip pandurate, 3-lobed, yellow with a reddish brown central blotch, 1.2–1.5 cm. long and 0.9–1.2 cm. wide, the lateral lobes small, suborbicular to subquadrate, obtuse, the central portion of the lip contracted into a distinct isthmus, the mid-lobe abruptly dilated, emarginate and bilobed, transversely reniform in outline, the disk with an erect, fleshy callus, at the base with 2 lateral crenulate or denticulate wings or plates, the apex with 3 short, fleshy teeth. Column about 5 mm. long, with the lateral wings often bifid, the lower lobules obtuse and spreading, the apices acute or acuminate, often more or less converging.

Mexico to Brazil and Peru; Virgin Islands and Martinique.

PANAMÁ: without definite locality, Pacific coast lowlands, *Fairchild s. n.* CHIRIQUÍ: without definite locality, *von Warscewicz s. n.* (fide Reichenbach).

The species of this type form a closely allied, very perplexing association including *Oncidium altissimum* Sw., *O. Baueri* Lindl., *O. sphacelatum* Lindl., *O. polycladium* Rehb. f., *O. stenotis* Rehb. f., *O. isthmi* Schltr., and *O. panamense* Schltr. *Oncidium stenotis* and *O. isthmi* can be separated easily, and although *O. sphacelatum* and *O. panamense* are very nearly alike, they differ from the other species in the broad basal half of the lip, without a distinct isthmus. The most troublesome series involves the remaining species, which have a broad but distinct isthmus to the lip, a transversely reniform mid-lobe, and variously developed multi-denticulate basal calli. These are extremely difficult to distinguish from one another, at least on the basis of herbarium material, since most of the described differences consist more nearly in the degree of development of essentially identical parts, rather than in any basic structural deviation. In particular, there seem to be no consistent characters upon which to base the further segregation of *O. polycladium* from *O. Baueri*, the former concept being here reduced to synonymy, thus extending the range of the widespread South American and West Indian *O. Baueri* as far north as Mexico. In our material, the latter species is separable from *O. panamense* by the distinct isthmus of the lip; from *O. isthmi* by the broader isthmus and narrower, shorter mid-lobe; and from *O. stenotis* by the smaller flowers, in which the lip is about equal to the lateral sepals in length. It seems quite probable that further study may reduce some of these, and other closely allied concepts, to varietal status or synonymy.

4. *ONCIDIUM BRACTEATUM* Warsc. & Rchb. f. in Bot. Zeit. 10:695. 1852.

Erect, epiphytic herbs with slender brown, compressed pseudobulbs, more or less linear in outline but usually somewhat broader at the base and tapering gradually to a narrower apex, 6–12 cm. tall and 1.5–3 cm. wide at the base, terminating above in 1 or 2 leaves, the base enveloped in several distichously imbricating bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, obtuse, coriaceous, 15–45 cm. long and 2–3.2 cm. wide, contracted below into elongate, slender, conduplicate petioles. Inflorescences 1 or 2 erect or arching panicles much exceeding the leaves, up to about 1 m. in length, the lateral branches short, usually 3-flowered, provided with several conspicuous, elongate, acute, pale brown, spathaceous bracts. Flowers of moderate size, the sepals and petals greenish yellow or yellow, heavily blotched and spotted dark brown or maroon, the apical and lateral lobes of the lip bright yellow, the central isthmus brown or maroon. Sepals subequal, free, spreading, with undulate margins, the dorsal sepal oblong-lanceolate, acute, 10–15 mm. long and 3.5–5 mm. wide, the lateral sepals linear-lanceolate, obliquely acute, with a distinct central keel on the dorsal surface, 12–17 mm. long and 2.5–4.5 mm. wide. Petals subequal to the dorsal sepal, elliptic-lanceolate, acute, with undulate margins, 10–15 mm. long and 4–6 mm. wide. Lip panduriform, with a broad central isthmus, 12–15 mm. long and 10–12 mm. wide at the 2-lobed emarginate apex, the base with 2 small, suborbicular, lateral auricles, the disk with an erect, more or less triangular, multidenticulate callus. Column 5–6 mm. long, with narrow lateral wings, the base without a foot.

Costa Rica and Panama.

Although absent from recent collections in our area, the species was originally described from plants presumably found in Panama by von Warscewicz, the data being given as "Chiriquí Cordilleran 6–9000 ft. auf Bäumen." They are readily distinguished by the narrow brown pseudobulbs and the very conspicuous, pale brown, spathaceous floral bracts.

5. *ONCIDIUM CABAGRAE* Schltr. in Fedde Rep. Sp. Nov. 9:292. 1911.

Oncidium Reckingerianum Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):202, fig. 18, C:a-c. 1922.

Erect, epiphytic herbs with slender, elliptic-ovoid to nearly linear, ancipitous pseudobulbs usually 6–11 cm. tall and 2–3 cm. wide, densely spotted dark brown or black, often becoming longitudinally ridged with age, the apex with 2 or 3 leaves, the lower portions enveloped in the conduplicate bases of several distichously imbricating bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, acute, subcoriaceous, 15–25 cm. long and 1.5–3 cm. wide, contracted below into slender, conduplicate petioles. Inflorescences usually solitary, erect or arching, many-flowered panicles much exceeding the leaves, up to about 80 cm. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, the sepals and petals heavily blotched rich chestnut-brown, usually

with yellow margins and apices, the mid-lobe and lateral lobules of the lip bright yellow with the central isthmus a rich reddish brown, the callus white spotted with brown. Sepals subequal, free, usually reflexed, with recurved apices, the dorsal sepal elliptic-obovate, acute, usually 8–12 mm. long and 4–6 mm. wide, the laterals linear-lanceolate to rather obliquely ligular, subacute to acute, with a distinct dorsal keel, usually 8–12 mm. long and 3–4 mm. wide. Petals somewhat broader than the sepals, slightly reflexed, with rather undulate margins, elliptic-oblongate, obtuse or acute, usually 10–12 mm. long and 5–6 mm. wide. Lip pandurate, usually 12–16 mm. long and 10–14 mm. wide at the 2-lobed, emarginate apex, the central portion abruptly contracted into a broad isthmus, the base with 2 small, lateral, obtuse, subquadrate auricles, the disk with an erect, fleshy, truncate keel, the upper margins with 2 pairs of fleshy teeth, the basal pair larger than the apical pair. Column short, erect, about 5 mm. long, with broad, lateral, spreading, rather bilobed or minutely dentate wings, the base of the column without a foot.

Costa Rica and Panama.

COCLÉ: region north of El Valle de Antón, 1000 m., *Allen 2361, 3681, 3776*; mountains beyond La Pintada, 400–600 m., *Hunter & Allen 589*. CHIRIQÚ: without definite locality, 4000–5000 ft., *Powell 161, 177*; vicinity Palo Alto, 4000 ft., *Powell 301*; Llano del Volcán, 1000 m., *Kieswetter s. n.*

An attractive species of the Coclé and Chiriquí highlands, usually found growing in the tops of tall trees.

6. *ONCIDIUM CARTHAGINENSE* (Jacq.) Sw. in K. Vet. Akad. Stockh. Nya Handl. 21:240. 1800.

Epidendrum carthaginense Jacq. Select. Stirp. Amer. 228, t. 133, fig. 4. 1763.

Epidendrum undulatum Sims, in Bot. Mag. t. 777. 1804.

Oncidium undulatum Salisb. in Trans. Roy. Hort. Soc. 1:295. 1812, non Lindl.

Oncidium panduriferum Kunth, in HBK. Nov. Gen. & Spec. 1:346, t. 82. 1815.

Oncidium Oerstedii Rchb. f. in Bonplandia 2:91. 1854.

Oncidium carthaginense (Jacq.) Sw. var. *Oerstedii* (Rchb. f.) Lindl. Fol. Orch. Oncid. (40). 1855.

Oncidium carthaginense (Jacq.) Sw. var. *Swartzii* Lindl. loc. cit. 1855.

Oncidium obsoletum Rich. et Gal. ex Lindl. loc. cit. 41. 1855.

Oncidium kymatoides Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):112. 1922.

Oncidium Oerstedii Rchb. f. var. *crispiflorum* Schltr. in Fedde, Rep. Sp. Nov. Beih. 17:85. 1922.

Robust, epiphytic herbs with very short, subquadrate, compressed or subcylindric, nearly obsolete pseudobulbs 1–2 cm. long and 1–1.5 cm. broad, the truncate apex with a single persistent, broadly lanceolate to elliptic-oblong, acute, usually fleshy leaf, which usually is more or less spotted reddish brown, 15–60 cm. long and 3.5–8 cm. wide, the lower surface with a strongly developed central keel, the pseudobulbs and the bases of the new leaves enveloped in 3–4 papery, closely imbricating bracts. Inflorescences elongate, erect, usually solitary, arching or sometimes pendulous, many flowered panicles up to 1.5 m. in length, produced from the bases of the pseudobulbs. Flowers variable in size and color, averaging

Fig. 200. *Oncidium carthaginense*

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about 2 cm. in diameter, usually more or less heavily blotched and spotted with purplish rose on a white base. Sepals of about equal length, spreading, or with the laterals somewhat reflexed, distinctly clawed at the base, the blades with strongly undulate margins, the dorsal sepal free, the claw narrowly linear, the blade abruptly dilated and suborbicular, somewhat concave, 8–11 mm. long and 5–7 mm. wide, the lateral sepals very shortly connate at the base, the blades obovate-spatulate, obtuse to acute, 7–12 mm. long and 4–6 mm. wide. Petals distinctly clawed at the base, spreading, with undulate, often crisped margins, the blades oblong to elliptic-oblong, obtuse, 8–12 mm. long and 5–7 mm. wide. Lip pandurate in outline, 3-lobed, abruptly contracted at the base and adnate to the base of the column, 8–12 mm. long and 6–10 mm. wide, the mid-lobe transversely subreniform, the anterior margin entire or sometimes shallowly emarginate, the central portion of the lip with a median constriction often prolonged into a short, broad isthmus confluent at the base with the oblong, obtuse, or triangular, rather auriculate lateral lobes, which are often somewhat reflexed, the disk with a prominent, more or less 4-parted, fleshy, erect, tuberculate crest. Column 2–3 mm. long, with large, spreading, unequally 2-lobed, lateral wings.

Florida and the West Indies; Mexico to Venezuela and Brazil.

CANAL ZONE: vicinity Fort Kobbe, on margins of mangrove swamps, sea level, *Allen* 2754. PANAMÁ: margin of the Pacific Ocean, northwest of Panama City, on slope of hill rising from the sea, *Powell* 1. CHIRIQUÍ: near city of David, sea level, *Powell* 270.

A rather variable species closely allied to *Oncidium guttatum* (L.) Rchb. f., widely distributed in the lowlands of the American tropics. Most of the available specimens from Panama would correspond fairly well to the concept of *O. carthagenense* var. *Oerstedii*, yet the supposed differences (shorter lip, longer isthmus, and brighter coloring) are found in an extensive series of specimens from the entire geographic range to merge imperceptibly with the type, leaving no clear-cut grounds for separation.

7. *ONCIDIUM CHEIROPHORUM* Rchb. f. in Bot. Zeit. 10:695. 1852.

Oncidium Dielsianum Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):197, t. 17, fig. F; a-b. 1922.

Dwarf, caespitose, epiphytic herbs averaging 12–15 cm. in height, with ovoid to suborbicular, compressed, monophyllous or rarely diphyllous pseudobulbs 1.5–3 cm. long and 1.4–2.5 cm. wide, at first smooth, often becoming finely wrinkled with age, the bases enveloped in several imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves linear-ligular, obtuse to subacute, pergameneous, 5–15 cm. long and 0.8–1.4 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching, densely paniculate scapes usually exceeding the leaves, up to about 30 cm. in length, produced from the lateral bases of the pseudobulbs. Flowers small, averaging 1–1.5 cm. in diameter, bright yellow and fragrant. Sepals of about equal length, the dorsal sepal erect, shortly clawed at the base, the orbicular blade deeply concave,

often with a minute apicule, about 5 mm. long and 4 mm. wide, the lateral sepals elliptic-obovate, obtuse, often reflexed, apparently very shortly connate at the base, 5-6 mm. long and 3-3.5 mm. wide. Petals shortly clawed, spreading, obovate-spatulate, obtuse, about 4-5 mm. long and 4 mm. wide. Lip conspicuously 3-lobed, averaging about 8 mm. long and 12 mm. wide, the sessile base adnate to the base of the column, the broadly spreading, auriculate, lateral lobes subquadrate to suborbicular, usually with reflexed margins, the central portion of the lip with an abrupt, narrow constriction, the mid-lobe transversely subreniform or 2-lobed, the lobules often porrect in natural position, the disk with a prominent, fleshy keel, the upper margins with 2 conspicuous subquadrate wings, between which at the apex there is a short membranaceous hood or concavity. Column very short, with large obovate, usually porrect, lateral wings, the base produced in front into a prominent, erect, fleshy horn. Anther with a long beak, otherwise typical of the genus.

Costa Rica, Panama, and Colombia.

COCLÉ: El Valle de Antón, 500-1000 m., *D. Allen* 3987, *Hunter & Allen* 350, *Allen* 236, 1681, 2914, 2939, 4211. CHIRIQUÍ: without definite locality, 5000 ft., *Powell* 54; Volcancitos, 5500 ft., *Davidson* 1261; Piedra de Lino, 1600 m., *Killip* 3571; valley of the upper Río Chiriquí Viejo, near Monte Lirio, 1300-1900 m., *Seibert* 224; trail from Paso Ancho to Monte Lirio, Río Chiriquí Viejo, 1500-2000 m., *Allen* 1499.

A small-flowered, dwarf, but attractive species very common in the highlands of Coclé and Chiriquí provinces in our area, where the plants often form dense clumps in the tops of tall trees or on the ends of spreading branches, often fully exposed to the sun.

8. *ONCIDIUM CRISTA-GALLI* Rchb. f. in Bot. Zeit. 10:697. 1852.

Oncidium iridifolium Lindl. in Bot. Reg. 22: t. 1911. 1836, non HBK.

Oncidium decipiens Lindl. Folia Orch. Oncidium, (22). 1855.

Dwarf, caespitose, epiphytic herbs less than 10 cm. tall, with small, ovoid, compressed pseudobulbs 10-20 mm. tall and 8-18 mm. wide, the apices with a single very short, conduplicate, ensiform, abortive leaf sometimes reduced to a very abbreviated foliaceous apicule, 2-15 mm. long and 1-2 mm. wide, the bases of the pseudobulbs almost completely enveloped by the distichously imbricating, conduplicate bases of 4 to 6 conspicuous, foliaceous bracts, the blades ligular, acute, pergameneous, 2-8 cm. long and 0.5-1.0 cm. wide, usually explanate but sometimes conduplicate and ensiform. Inflorescences 1 to 4 erect or arching, filiform, 1-flowered scapes about equaling the leaves in length, produced from the axils of the foliaceous bracts, the peduncles provided with 3 or 4 distant, perfoliate, acuminate, spathaceous bracts 6-10 mm. long and about 3 mm. broad. Flowers very large in relation to the size of the plant, 2-3 cm. long and 1.8-2.2 cm. wide. Sepals free, spreading, the dorsal sepal erect, elliptic-ovate, slightly concave with a dorsal keel, terminating in a short apicule, the blade greenish yellow, 5-6 mm.

Fig. 201. *Oncidium crista-galli*

long and 3–4 mm. wide, the lateral sepals very inconspicuous, appressed to the back of the lip, rather obliquely linear-ligular, acuminate, greenish yellow, 5–6 mm. long and 2–2.5 mm. wide. Petals broadly spreading, oblong, rather obliquely obtuse and apiculate, bright yellow with transverse bands of reddish brown, the margins often undulate, 8–10 mm. long and 4–5 mm. wide. Lip complexly 3-lobed, 1.5–2.2 cm. long and 1.7–2.2 cm. wide, bright yellow, the margins undulate, the base shortly contracted and adnate to the base of the column, the lateral lobes spreading, obovate-spatulate, the dilated suborbicular blades 7–8 mm. long and 6–8 mm. wide, the mid-lobe much broader at the base than at the apex, divided into 4 lobules, the lateral basal pair rounded and spreading, the apical pair projecting, obliquely cuneate, separated by a deep central sinus, the disk convex, white with reddish brown blotches, with a prominent, spreading, fleshy, suborbicular plate and ruffled and crisped margins, subtended on each side by semicircular, crisped extensions, the apex terminating in a short, complex, crisped, fleshy hood. Column very short, about 3 mm. long, with conspicuous, lateral, dolabriform wings.

Mexico to Colombia and Peru.

COCLÉ: mountains beyond La Pintada, 400–600 m., *Hunter & Allen 588*; El Valle de Antón, 600–1000 m., *D. Allen 5158*, *Allen & Allen 1251, 1675, 2883, 3809*.

A remarkable, attractive, dwarf species of the wet highland forests of Coclé Province, with relatively large, bright yellow flowers, the plants superficially reminiscent of those of *Oncidium pusillum*, but readily distinguished by the presence of small suborbicular pseudobulbs and the filiform, rather than complanate, scapes.

9. *ONCIDIUM EBRACHIATUM* A. & S. in Sched. Orch. 8:75, fig. 6. 1925.

Pendulous, epiphytic herbs with fleshy, terete, longitudinally sulcate, acuminate leaves up to about 60 cm. in length, the plants identical in appearance with those of *Oncidium stipitatum*. Inflorescences usually solitary, arching, many-flowered panicles, produced from the bases of the plants. Flowers very small for the genus, about 1 cm. in length, the sepals and petals spotted with reddish brown, the lip yellow on both surfaces. Sepals free, spreading, the dorsal sepal suborbicular, strongly concave, incurving over the column, with an obscure, terminal apicule, the blades 3–3.5 mm. long and about 2.5 mm. wide, the lateral sepals obovate-spatulate, obtuse, minutely apiculate, the blades somewhat concave and incurving, about 4 mm. long and 2–2.2 mm. wide. Petals widely spreading, rather obliquely elliptic-oblong, obtuse, about 4 mm. long and 2–2.1 mm. wide. Lip pandurate, 3-lobed, about 8 mm. long and 6 mm. wide, the sessile base adnate to the base of the column, the lateral lobes subfalcate, obtuse, spreading, or with the apices somewhat antrorse in natural position, the lower margins confluent with the narrow central isthmus, the mid-lobe dilated and emarginate, flabellate-reniform in outline, often porrect in natural position, the minutely papillose disk with a broad, fleshy, flat, lunate, porrect plate below the column, terminating below the apex in a central, subtrilobed tubercle, on each side of which are lightly converging keels, terminating in low tuberculate swellings. Column very short and stout, about 1 mm. long, without prominent lateral wings.

Panama.

PANAMÁ: without definite locality, *M. D. Hunter s. n.*; coastal swamps east of Panama City, between the Jagua Hunt Club and Congor Hill, sea level, *Hunter & Allen 471*; San José Island, Perlas Archipelago, *Johnston 1340*. DARIÉN: Cana and vicinity, 2000–6500 ft., *R. S. Williams 975*; Río Tuira, near Pinogana, 100 ft., *Allen 4309*.

A small-flowered, terete-leaved species very closely allied to *O. nudum* Lindl. of South America; apparently confined to the lowlands of the eastern half of Panama.

10. *ONCIDIUM ENSATUM* Lindl. in Bot. Reg. n. s. 5: Misc. 17. 1842.

Oncidium cerebriferum Rchb. f. in Bot. Zeit. 10:696. 1852.

Oncidium confusum Rchb. f. in Xenia Orch. 1:234. 1858.

Erect, terrestrial herbs with fleshy, ovoid, somewhat compressed, usually smooth pseudobulbs 5.5–8 cm. tall and 3.5–5 cm. wide, the truncate apices with 1 to 3 leaves, the bases enveloped in 4–6 imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous, the blades persistent, not articulated and not separating by a suture near the base. Leaves and bract blades linear-lanceolate, acuminate, subcoriaceous, 45–90 cm. long and 2–3 cm. wide, rather rigidly erect, with a strong central keel, the margins somewhat conduplicate, particularly for the lower half. Inflorescences 1 or 2 erect or arching, many-flowered panicles equaling or exceeding the leaves, produced from the lateral bases of the pseudo-

bulbs. Flowers of moderate size, in fresh material averaging about 3 cm. in diameter when spread out. Sepals subequal, free, spreading or reflexed, greenish or brownish olive, usually with undulant margins, the dorsal sepal oblanceolate, acute, 10–12 mm. long and 4–5 mm. wide, the lateral sepals lanceolate, acuminate, 13–15 mm. long and 3.5–4 mm. wide, with a pronounced dorsal keel. Petals subequal to the dorsal sepal and similarly colored, spreading or reflexed, with undulant margins, obliquely oblanceolate, acute, 12–14 mm. long and 4–5 mm. wide. Lip panduriform, 3-lobed, bright yellow, about 1.5 cm. long and 1.5 cm. wide, abruptly contracted at the base and adnate to the base of the column, the small lateral lobes oblong, obtuse or obscurely auriculate, the anterior margins confluent with the margins of the broad central isthmus, the mid-lobe dilated, 2-lobed, transversely subreniform, the disk olive-green, with a prominent, fleshy, white, 7-toothed callus. Column short, with prominent, lateral wings.

British Honduras to Panama.

PANAMÁ: foothills east of Panama City, sea level, Powell 267; vicinity Juan Díaz, Powell 3484; in low thick scrub, along Río Tecúmen, east of Panama City, about 30 m., Hunter & Allen 266, Allen 5159.

A fairly common terrestrial species of the Pacific slope, often found growing in low scrub in association with *Peristeria elata*, or sometimes in open grassland. In herbarium specimens, the species considerably resembles *Oncidium panamense*, but may be distinguished readily by the narrower basal callus, the terrestrial habit, and in the complete lack of articulations near the bases of the foliaceous bracts.

11. *ONCIDIUM GLOBULIFERUM* HBK. Nov. Gen. & Sp. 1:347. 1815.

Oncidium scansor Rchb. f. in Linnaea 22:844. 1849.

Oncidium convolvulaceum Lindl. in Paxt. Flow. Gard. 1:102, sub *t.* 21. 1850-51.

Oncidium globuliferum HBK. var. *costaricense* Rchb. f. in Gard. Chron. 1678. 1871.

Oncidium Wercklei Schltr. in Fedde Rep. Sp. Nov. Beih. 19:68. 1923.

Epiphytic herbs with solitary or clustered, elliptic-oblong to suborbicular, compressed, monophyllous pseudobulbs 1.2–2.5 cm. long and 1–2 cm. wide, very distantly distributed along the slender, flexuose, scandent rhizomes, the bases of the pseudobulbs partially enveloped in the conduplicate bases of several distichously imbricating bracts the uppermost pair of which being conspicuously foliaceous. Leaves elliptic-oblong to elliptic-lanceolate, obtuse to subacute, coriaceous, 2.5–6 cm. long and 1–2 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 short, erect, 1-flowered scapes about equaling the leaves in length, produced from the lateral bases of the pseudobulbs. Flowers very large in relation to the size of the plant, 2.5–3 cm. long and 2–2.5 cm. wide. Sepals free, spreading, yellow barred with reddish brown, the dorsal sepal elliptic-oblong, shortly acute, 8–12 mm. long and 4–5 mm. wide, the lateral sepals rather obliquely lanceolate, acute, 10–12 mm. long and 3–4 mm. wide. Petals somewhat broader than the sepals, yellow with reddish brown bars, elliptic-oblong, obtuse to subacute, 10–12 mm. long and 5–6 mm. wide. Lip 3-lobed, broadly spreading,

Fig. 202. *Oncidium globuliferum*

1.7–2 cm. long and 2–2.5 cm. wide, abruptly contracted at the base and adnate to the base of the column, the small subquadrate, auriculate, obtuse, lateral lobes spreading, the anterior margins confluent with the margins of the short, broad, central isthmus, the mid-lobe spreading, emarginate, 2-lobed, broadly and transversely reniform, bright yellow, about $\frac{2}{3}$ the total length of the lip, the disk with a more or less triangular, 7-toothed, fleshy callus. Column short, about 5 mm. long, with a pair of spreading lateral wings.

Costa Rica to Venezuela and Peru.

COCLÉ: region north of El Valle de Antón, 1000 m., *Allen 5201*. CHIRIQUÍ: vicinity Bajo Mono and Quebrada Chiquero, 1500 m., *Woodson & Schery 572*; without definite locality, 5000 ft., *Kieswetter s. n.*; vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen 1567*.

Unique among the *Oncidiums* of Panama in having elongate, slender, flexuose rhizomes, the plants often forming large tangled colonies in the tops of tall trees in the wet highland forests. They are seldom seen except as fragments which have fallen from above, usually being rendered conspicuous by the yellowish rhizomes which superficially resemble the stems of a dodder. The solitary flowers are bright yellow, very large in relation to the size of the plant, often exceeding the pseudobulbs in diameter.

12. *ONCIDIUM HETERANTHUM* Poepp. & Endl. Nov. Gen. & Sp. 1:34, t. 60. 1836.

Oncidium bryolophotum Rchb. f. in Gard. Chron. 738. 1871.

Oncidium ionops Cogn. & Rolfe in Jour. des Orchid. 3:346. 1892.

Oncidium megalous Schltr. in Fedde Rep. Sp. Nov. 9:30. 1910.

Erect, caespitose, epiphytic herbs with linear or narrowly ovoid, rather compressed pseudobulbs up to about 5 cm. tall and 2 cm. wide, the truncate apices with 1 or 2 leaves, the bases enveloped in several imbricating bracts the uppermost 2 of which are conspicuously foliaceous. Leaves narrowly linear to elliptic-lanceolate, acute, subcoriaceous, 4–18 cm. long and 0.8–3.5 cm. wide, contracted below into very short conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching panicles usually much exceeding the leaves, up to about 75 cm. long. Flowers dimorphic, each lateral branch of the inflorescences terminating in a single normal flower averaging about 2 cm. long and 1.2 cm. wide, subtended by many very dissimilar, small, stelliform, abortive, sterile flowers. Perianth segments of the sterile flowers broadly spreading, narrowly linear to spatulate, yellowish, 3–4 mm. long, the lip generally entirely aborted. Normal flowers with the sepals free, elliptic-lanceolate to ligular, shortly acute to obtuse, the bases shortly clawed, the blades often with undulate margins, yellow blotched with reddish brown, 6–10 mm. long and 2–3 mm. wide. Petals elliptic-oblong to obliquely obovate-spatulate, obtuse to subacute, clawed at the base, yellow blotched with reddish brown, 7–10 mm. long and 2.5–3.5 mm. wide. Lip broadly panduriform, 10–12 mm. long and 10–15 mm. wide, subequally 4-lobed, the lateral lobes broadly triangular,

obtuse, or rounded, the anterior margins converging and forming a short isthmus or narrow, median constriction above the abruptly dilated, spreading, transversely reniform, 2-parted, bright yellow mid-lobe, the disk with an erect, fleshy, tuberculate callus terminating at the apex in 3 short teeth. Column short, 3–4 mm. long, with 2 very prominent lateral wings.

Costa Rica, Panama, Colombia, Peru, Bolivia, and probably adjacent territories.

CHIRIQUÍ: without definite locality, "On large trees, in dense shade", 5000 ft., *Kieswetter s. n.*, *Powell 48*; central valley of the Río Chiriquí Viejo, vicinity of New Switzerland, 1800–2000 m., *Allen 1381*.

A curious highland species distinguished by the abundant yellowish, stelliform, abortive florets, subtending the normal flowers on the branches of the paniculate inflorescences.

13. *ONCIDIUM ISTHMI* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:84. 1922.

Robust, erect, epiphytic herbs with approximate, narrowly ovoid to linear-oblong, compressed, longitudinally ridged, usually diphyllous pseudobulbs 8.5–12 cm. long and 3–4 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of 6–7 bracts, the uppermost 4–5 of which are conspicuously foliaceous. Leaves and bract blades linear-lanceolate, acute, subcoriaceous, 15–45 cm. long and 1.5–3.2 cm. wide, the foliaceous bracts articulated near the base, with a distinct suture, the blades ultimately deciduous. Inflorescences 1 or 2 erect or arching, many-flowered panicles up to about 1 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size, 2.5–3 cm. long and 1.5–2.2 cm. wide. Sepals free, spreading, clawed at the base, yellow barred with brown, the dorsal sepal elliptic-oblong, acute, with undulate margins, 9–12 mm. long and 4–5 mm. wide, the lateral sepals obliquely oblong, subacute, with undulate margins, 10–13 mm. long and 4–5 mm. wide. Petals rather obliquely oblong, subacute, with undulate margins, yellow barred with brown, 10–12 mm. long and 4–5 mm. wide. Lip panduriform, 3-lobed, bright yellow, the small auriculate, lateral lobes subquadrate to suborbicular, the frontal margins abruptly contracted into a narrow central isthmus, the mid-lobe broadly dilated and 2-lobed, transversely reniform, occupying about $\frac{2}{3}$ of the total length of the lip, the disk brown, with an erect, compact, 7-toothed basal callus. Column short, about 4 mm. long, with prominent lateral wings.

Costa Rica and Panama.

CANAL ZONE: San Juan, upper Chagres River, sea level, *Powell 397*. PANAMÁ: without definite locality, sea level, *Fairchild s. n.*; vicinity Pacora, sea level, *Allen 3442*. DARIÉN: Río Sambú, 200 m., *Pittier 5569*.

Robust lowland epiphytes, vegetatively nearly identical with *O. panamense* and *O. Baueri* but readily distinguished by the larger, conspicuously expanded mid-lobe and the much narrower isthmus of the lip.

14. *ONCIDIUM KRAMERIANUM* Rchb. f. in Otto & Dietr. Allgem. Gartenzeit. 23:9. 1855.

Oncidium Papilio var. *Kramerianum* Lindl. Folia Orch. Oncidium, (56). 1855.

Oncidium nodosum Ed. Morren in Belg. Hort. 24:258. 1874, in adnot.

Papilioopsis nodosus Ed. Morren loc. cit. 1874.

Oncidium papilioniforme Regel, in Act. Hort. Petrop. 6:292. 1880.

Oncidium Kramerianum var. *resplendens* Rchb. f. in Gard. Chron. 3:360. 1888.

Erect, caespitose, epiphytic herbs with suborbicular to subquadrate, truncate, compressed, more or less rugose, monophyllous pseudobulbs 2.5–4 cm. in diameter, the bases enveloped in several papery, imbricating bracts which soon weather away. Leaves elliptic-oblong, acute, persistent, rigidly coriaceous, 15–25 cm. long and 3.5–6.5 cm. wide, contracted below into very short, conduplicate petioles, the lower surfaces of the leaves often more or less suffused with purple and with a strong central keel, the upper surfaces deep green, sometimes mottled darker green or purple. Inflorescences 1 or 2 erect or arching, prominently jointed scapes up to about 75 cm. in length, produced from the lateral bases of the pseudobulbs, the nodes conspicuously swollen, each provided with an elongate, acute, tubular, papery sheath clasping the lower halves of the cylindric internodes, the apex of the scape with a subconic, acute, terminal "bud" made up of several very closely imbricating sheaths, representing a much condensed raceme, the 5–8 flowers produced singly in succession from the axils of the sheaths, each flower lasting about a week. After the initially produced raceme has been exhausted, the scapes frequently elongate from one of the upper nodes, and again produce a series of flowers so that any given scape may remain in flower for as much as a year. Flowers large and richly colored. Sepals free, the dorsal sepal and the petals similar, erect, narrowly linear-spatulate, acute, rich reddish brown, the upper portions with undulate margins, 5.5–8 cm. long and 0.5–0.7 cm. wide, the lateral sepals very dissimilar, narrowly clawed at the base, the blades abruptly dilated above the claw, obliquely elliptic-ovate, obtuse to subacute, subfalcately deflexed with strongly undulate margins, yellow heavily blotched with rich reddish brown, 3–5 cm. long and 1–2.5 cm. wide. Lip about equaling the lateral sepals in length, subpandurate, 3-lobed, 3–4.5 cm. long and 3–4.5 cm. wide, richly blotched reddish brown, the lateral lobes rounded, the basal third of the lip suborbicular to transversely oblong in outline, undulate-margined, the central portion with a deep median constriction, which may sometimes be prolonged into a short, broad isthmus, the mid-lobe very large, spreading, transversely subquadrate to suborbicular, with a conspicuous bright yellow central blotch, the margins very strongly undulate, the disk at the base of the lip with a prominent, fleshy, minutely papillose, 5-parted, tuberculate crest. Column 6–8 mm. long, with 2 prominent lateral wings above which are 2 elongate, linear processes, thickened at the apices into small blackish glands.

Costa Rica to Colombia and Ecuador.

A very handsome species, often cultivated for its large, richly colored flowers. Although no authentic specimens have been collected in Panama, it has been several times reported from our area, notably from the vicinity of Chiriquí Lagoon and

from the vicinity of Puerto Armuelles. Since it is fairly frequent in closely adjacent territory in both Costa Rica and Colombia, there is every reason to believe that it will eventually be collected somewhere in the intermediate area.

15. *ONCIDIUM NEBULOSUM* Lindl. in Bot. Reg. n. s. 4: Misc. 175. 1841.

Oncidium Geertianum Morren, in Ann. Soc. Roy. d'Agr. et Bot. Gand 4:55, t. 179. 1848.

Oncidium caesium Rchb. f. in Gartenfl. 75. 1854.

Oncidium Klotzschianum Rchb. f. in Walp. Ann. 6:802. 1861.

Erect, epiphytic herbs with short, fleshy, approximate, ovoid to suborbicular, somewhat compressed, diphyllous pseudobulbs up to about 4 cm. long and 3 cm. wide, the bases usually with 2 foliaceous bracts. Leaves and bract blades narrowly lanceolate, obtuse to subacute, subcoriaceous, 9–20 cm. long and 2–2.5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect or arching, few-flowered racemes up to about 36 cm. long, produced from the lateral bases of the pseudobulbs. Flowers relatively large, up to about 5 cm. long and 3 cm. wide. Sepals free, subequal, usually reflexed, pale yellow to greenish yellow, shaded or spotted with red or purple, lanceolate, acute, the lateral sepals somewhat oblique, 1.2–1.5 cm. long and 3–5.5 mm. wide. Petals spreading, subequal to the sepals or a little broader, ligular to elliptic-lanceolate, obtuse to subacute, yellow or greenish yellow, shaded or spotted with red or purple, 1.2–1.5 cm. long and 0.4–0.7 cm. wide. Lip pandurate, 3-lobed, 2–2.5 cm. long and 2–2.5 cm. wide, bright yellow, the lateral lobes small, obliquely triangular or subquadrate, obtuse, the anterior margins contracted into a narrow isthmus, the mid-lobe abruptly and broadly dilated and 2-lobed, transversely reniform, the disk with a short, fleshy, 5-toothed callus. Column about 5 mm. long, with prominent lateral wings.

Mexico, Guatemala, and Panama.

Absent from recent collections, but cited by Lindley (Fol. Orch. *Oncidium* (48). 1855) as "Wild in Veragua, Chiriqui, at 4–5000 ft.—Warczewicz." Probably a rather doubtful record, since it is not known from adjacent Costa Rica, or from any of the other Central American countries south of Guatemala.

16. *ONCIDIUM OBRYZATUM* Rchb. f. in Bonplandia 2:108. 1854.

Oncidium obryzatoides Kränzl. in Engler, Pflanzen. IV, Fam. 50 (Heft 80):240. 1922.

Oncidium fulgens Schltr. in Fedde Rep. Sp. Nov. Beih. 17:83. 1922.

Oncidium varians Schltr. loc. cit. 19:151. 1923.

Oncidium Brenesii Schltr. loc. cit. 257. 1923.

Oncidium graciliforme C. Schweinf. in Bot. Mus. Leaflet. Harv. Univ. 5:96. 1938.

Erect, epiphytic herbs with approximate, suborbicular, ovoid, or elliptic-oblong, compressed, monophyllous pseudobulbs 2.5–9 cm. tall and 0.8–3 cm. wide, usually conspicuously ridged and wrinkled, often spotted or suffused with dark brown or black, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2–4 of which are conspicuously foliaceous, the plants very variable in size, 1–4.5 dm. tall. Leaves and bract blades elliptic-oblong, ligular or sometimes narrowly linear, subacute, coriaceous, 10–35 cm. long

and 0.8–3.5 cm. wide, contracted below into slender conduplicate petioles. Inflorescences usually solitary, erect or arching, many-flowered panicles apparently always exceeding the leaves, in robust plants up to 1.5 m. in length, although often much less, in our specimens averaging about 4.5–6 dm. long. Flowers very variable in size, 1.5–3.5 cm. long and 1–2.5 cm. wide. Sepals subequal, free, spreading, obovate-spatulate, obtuse or truncate, golden yellow with chestnut-brown blotches at the base, 6–14 mm. long and 2.5–5 mm. wide. Petals usually broader than the sepals, obovate-spatulate, obtuse or truncate, golden yellow with basal chestnut-brown blotches, 6–12 mm. long and 3–6 mm. wide. Lip pandurate, 3-lobed, 10–20 mm. long and 8–20 mm. wide, golden yellow with a U-shaped reddish brown blotch surrounding the yellow basal callus, the lateral lobes subquadrate, obliquely triangular or rounded, the basal $\frac{2}{5}$ of the lip roughly triangular to suborbicular, the central portion of the lip abruptly contracted into a short, narrow isthmus, the mid-lobe dilated, spreading, 2-lobed with a deep central sinus, often transversely reniform in outline, the disk with an erect, fleshy basal crest, sometimes 5 (or more)-lobulate with 3 distinct apical teeth, or obscurely lobulate with only 2 distinct apical lobes. Column 3–4 mm. long, with prominent, usually perfect, lateral wings, the apices often more or less converging over the anther.

Costa Rica, Panama, Colombia, Ecuador, and Peru.

COCLÉ: region north of El Valle de Antón, 800–1000 m., *Allen* 225, 2923, 2938, 3424. CHIRIQUÍ: without definite locality, 4000–5000 ft., *Powell* 3158, 3159, 3160, 3227; vicinity Boquete, *Svibla* s. n.

A common, very variable species of the tree tops of areas of wet highland forest, distinguished from most other Panama *Oncidium*s by the obovate-spatulate, usually truncate sepals and petals.

17. *ONCIDIUM OCHMATOCHILUM* Rchb. f. in Bot. Zeit. 10:698. 1852.

Oncidium cardiobulum Lindl. Fol. Orch. *Oncidium*, (27). 1855.

Erect, usually robust, epiphytic herbs up to about 75 cm. tall, the many, conduplicate, distichously imbricating bases of the foliage contracted into a complanate petiole, often completely enveloping the usually inconspicuous, compressed, narrowly ovoid, diphyllous pseudobulb which may be up to about 10 cm. long and 2.5 cm. wide. Leaves narrowly lanceolate, acute to acuminate, coriaceous with prominent veins, sometimes conduplicate for their entire length, more frequently explanate, 25–70 cm. long and 1.5–6 cm. wide. Inflorescences 1 or 2 stout, erect or arching, many-flowered panicles up to about 2 m. in length but sometimes much shorter, produced from the axils of the uppermost basal leaves, the terminal portion of the inflorescence and the lateral branches distinctly fractiflex. Flowers of moderate size, averaging about 3 cm. long and 2 cm. wide when spread out, with a strong lilac-like fragrance when fresh. Sepals free, pale green marked with brown, the dorsal sepal lanceolate, acuminate, often strongly reflexed, 1.5–2 cm. long and 0.3–0.4 cm. wide, the lateral sepals obliquely linear-lanceolate, acuminate, the dorsal surface with a prominent central keel, 1.5–2 cm. long and

0.3–0.4 cm. wide. Petals broader than the sepals, elliptic-lanceolate, acute, brown or greenish brown, sometimes mottled white or with paler apices, 1.3–1.7 cm. long and 0.4–0.55 cm. wide. Lip panduriform, 3-lobed, 1–1.3 cm. long and 1–1.3 cm. wide, white spotted with brown or reddish purple at the base, the lateral lobes subquadrate, obtuse, projecting, the base of the lip subequal to, or sometimes exceeding the mid-lobe in width, the central portion contracted into a short distinct isthmus, the mid-lobe abruptly dilated, entire or apiculate, transversely semiorbicular or subcordate, the disk with a prominent, fleshy, multi-tuberculate callus terminating at the apex in a short, erect, obtuse, laterally compressed keel above and below which are 2 pairs of short fleshy teeth. Column 5–6 mm. long, apparently without lateral wings, the base without a foot.

Guatemala, Costa Rica, Panama, Colombia, Peru, and probably adjacent territories.

COCLÉ: El Valle de Antón, 3600 ft., *A. Bouché* 9. CHIRIQUÍ: without definite locality, 4500 ft., *Powell* 160.

The plant collected by Mr. Bouché was reported to have been a massive specimen weighing in the neighborhood of fifty pounds, with nearly a thousand flowers evidently borne on several inflorescences, the fragrance having been perceptible for some considerable distance.

18. *ONCIDIUM PANAMENSE* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:85. 1922.

Erect, robust epiphytic herbs with approximate, oblong-ovoid, compressed, strongly ridged, diphyllous pseudobulbs 6–16 cm. long and 2–6 cm. wide, enveloped below in the conduplicate, distichously imbricating bases of 3–4 elongate, foliaceous bracts. Leaves and bract blades linear-lanceolate, acute, subcoriaceous, 12–75 cm. long and 1.5–4 cm. wide, contracted below into elongate, conduplicate petioles. Inflorescences 1 or 2 erect, arching, pendulous or sometimes scandent, many-flowered panicles 1–3.5 m. in length, produced from the lateral bases of the pseudobulbs. Flowers of moderate size averaging about 2.5 cm. in diameter. Sepals free, subequal, spreading, shortly clawed at the base, yellow heavily barred and blotched olive-brown, elliptic-obovate, acute, with somewhat undulate margins, 10–13 mm. long and 4–5 mm. wide. Petals subequal to the sepals and similarly colored, spreading, often with recurved apices, elliptic-obovate to elliptic-lanceolate, acute, with somewhat undulate margins, 10–12 mm. long and 4–5 mm. wide. Lip obscurely 3-lobed, broadly pandurate, yellow with a large, transverse, reddish brown to yellowish brown blotch below the crest, the lip 10–15 mm. long and 10–15 mm. wide, the lateral lobes rounded or broadly and obtusely triangular, the central lip with a sharp constriction but without a distinct isthmus, the mid-lobe emarginate, obscurely 2-lobed, transversely oblong or subreniform, the basal and apical halves of the lip of about equal width, the disk with an erect, white, fleshy crest surmounted by 4 divergent, usually crenulate keels, terminating at the apex in 3 distinct fleshy teeth. Column short, 3–5 mm. long, with 2 prominent, spreading, usually serrate, lateral wings.

Panama.

CANAL ZONE: San Juan, upper Chagres River, sea level, *Powell* 416, 3201. PANAMÁ: hills east of Panama City, sea level, *Powell* 3228; without definite locality, 50 m., *Kieswetter* s. n.; San José Island, Perlas Archipelago, *Erlanson* 209; vicinity Pacora, 25 m., *G. Fairchild* s. n.; vicinity Chepo, 20 m., *Allen* 2360.

A very common, robust, lowland species closely allied to the widely distributed Central American *O. sphacelatum*, but apparently differing in the broader basal callus and the larger column wings. Among the vegetatively similar or identical local species, it is separable from *O. isthmi* and *O. Baueri* by the uniformly broader basal half of the lip and the absence of a true isthmus, and from *O. ensatum* by the epiphytic habit and the presence of distinct articulations near the bases of the foliaceous bracts.

19. *ONCIDIUM PANDURIFORME* A. & S. in Sched. Orch. 8:77. 1925.

Erect, caespitose, epiphytic herbs 35–55 cm. tall, with distichous foliage, the conduplicate, imbricating bases enveloping a small, linear to narrowly ovoid, compressed, 1- or 2-leaved pseudobulb 5–7 cm. long and 0.8–2 cm. wide, the plants reminiscent of those of *Oncidium ochmatochilum*. Leaves linear-lanceolate, acute, subcoriaceous, rather coarsely veined, the blades up to about 40 cm. long and 1.5–3 cm. wide. Inflorescences usually solitary, stout, erect or arching, many-flowered panicles much exceeding the leaves, up to about 1 m. in length, produced from the axils of the foliaceous bracts, the terminal portion and the lateral branches usually distinctly fractiflex. Flowers rather small, averaging about 2 cm. in diameter. Sepals subequal, free, spreading or strongly reflexed, yellowish brown with yellow apices, the dorsal sepal lanceolate, acute, 9–12 mm. long and 2.5–3 mm. wide, the lateral sepals linear-lanceolate, acute, 10–12 mm. long and 2–2.5 mm. wide, the reverse surfaces with prominent central keels. Petals usually broader than the sepals, similarly colored, elliptic-lanceolate, acute, spreading or reflexed, 9–10 mm. long and 4–5 mm. wide. Lip pandurate, obscurely 3-lobed, white, 9–12 mm. long and 8–10 mm. wide, the lateral lobes small and rounded or obtusely triangular, the anterior margins converging to form a short, broad isthmus, the mid-lobe abruptly dilated, spreading, transversely semiorbicular, the under-surface at the apex with a short, strongly developed keel terminating in an apicule, the disk with a low, fleshy, obscurely tricarinate callus at the base. Column about 5 mm. long, without lateral wings but with 2 pronounced, parallel, marginal thickenings on the under-surface below the stigma.

Costa Rica and Panama.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, 1900 m., *Woodson* & *Schery* 704.

Apparently closely allied to *Oncidium ochmatochilum*, but differing in the obscure, lateral lobes of the lip, and the much less complexly developed basal callus.

20. *ONCIDIUM PARVIFLORUM* L. Wms. in Amer. Orchid Soc. Bull. 11:33. 1942.

Small, erect, epiphytic herbs, with approximate, elliptic-oblong, compressed, longitudinally ridged, monophyllous pseudobulbs 5–7 cm. long and 2–3 cm. wide,

densely spotted or suffused with brown, enveloped below in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2 of which are conspicuously foliaceous. Leaves and bract blades ligular, obtuse, subcoriaceous,

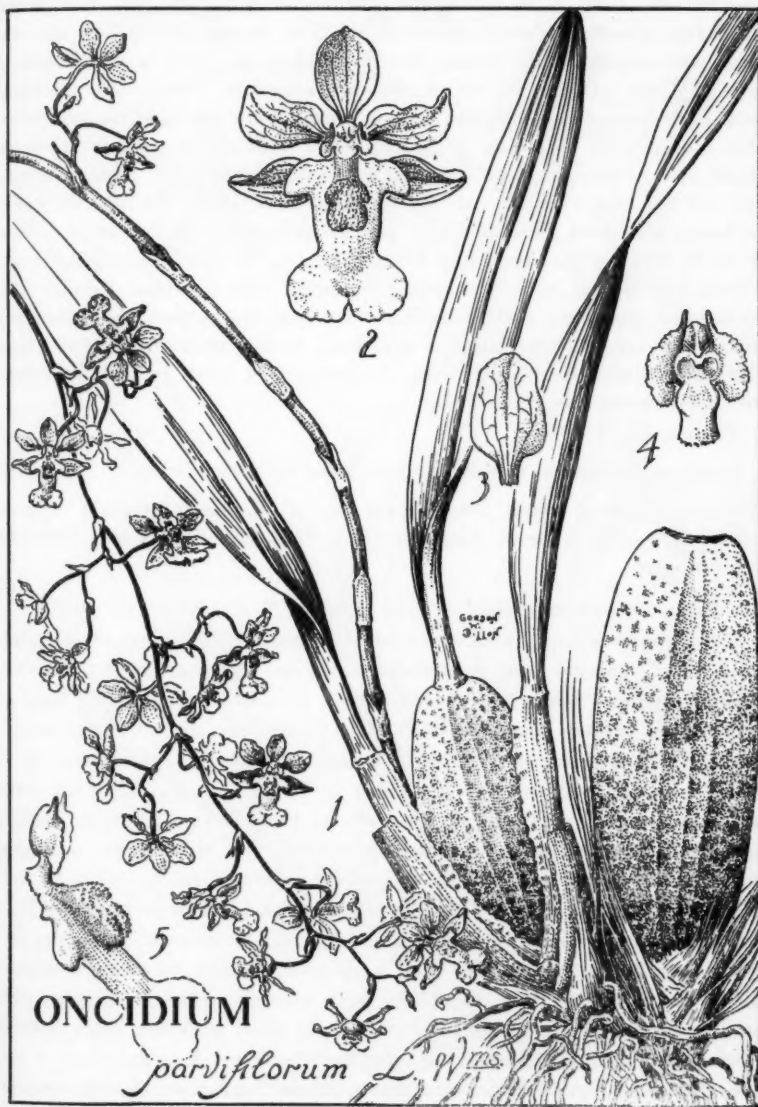


Fig. 203. *Oncidium parviflorum*

(537)

11–13 cm. long and 1.2–1.6 cm. wide, contracted below into narrow, conduplicate petioles. Inflorescences solitary, erect or arching, many-flowered panicles up to about 75 cm. long, produced from the lateral bases of the pseudobulbs, the lateral branches very short, 1- to 3-flowered. Flowers small, 1.2–1.5 cm. in diameter. Sepals free, spreading, shortly clawed at the base, brown with yellow tips, the dorsal sepal elliptic-oblong, obtuse, shortly apiculate, 5–6 mm. long and about 3 mm. wide, the lateral sepals rather obliquely lanceolate, acute, with prominent dorsal keels, about 6 mm. long and 2.5 mm. wide. Petals clawed at the base, somewhat broader than the sepals, spreading, brown with yellow tips, oblong-ovate, obtuse, about 6 mm. long and 3.5 mm. wide. Lip pandurate, 3-lobed, 8–9 mm. long and 5–6 mm. wide, the frontal and lateral lobes yellow, the isthmus brown, the lateral lobes small, auriculate, with subacute deflexed apices, the central portion of the lip abruptly contracted into a broad isthmus, the mid-lobe emarginate and 2-lobed, subreniform, slightly exceeding the lateral lobes in width, the disk with a prominent, pubescent, 4-lobulate callus at the base, at first pure white, becoming yellow with age. Column about 3 mm. long, with 2 prominent lateral wings, which are rounded below and produced above into 2 erect, parallel, acuminate processes on either side of the anther.

Panama.

COCLÉ: region north of El Valle de Antón, about 1000 m., *Allen 2937*.

A small-flowered species, found in the tops of tall trees in the wet highland forests north of El Valle de Antón, in Coclé Province. Known only from the type collection.

21. *ONCIDIUM POWELLII* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:86. 1922.

Erect, epiphytic herbs, with approximate, oblong-ovoid, compressed, longitudinally ridged, monophyllous pseudobulbs 6–13 cm. long and 2.5–5 cm. wide, partially enveloped below in the conduplicate, distichously imbricating bases of 3–4 foliaceous bracts. Leaves and bract blades oblong-lanceolate to ligular, usually obtuse or slightly retuse at the apex, or sometimes subacute, subcoriaceous, up to about 45 cm. in length but averaging about 20–25 cm. long and 2.5–5 cm. wide. Inflorescences usually solitary, arching, few- to many-flowered, flexuose panicles much exceeding the leaves, sometimes up to nearly 1.5 m. long but averaging about 7.5–9 dm., produced from the axils of the uppermost foliaceous bracts, each of the short lateral branches of the inflorescence with 1–3 flowers subtended by a few conspicuous, white, papery, spathaceous sheaths. Flowers variable in size but always large and attractive, 3–6 cm. in diameter. Sepals subequal, spreading, shortly clawed at the base, the blades with strongly undulate margins, rich chocolate-brown barred and margined yellow, the dorsal sepal free, erect, broadly elliptic-oblong to obovate, obtuse to subacute, 1.5–2.5 cm. long and about 1 cm. wide, the lateral sepals free or sometimes with the basal claws shortly connate, rather obliquely oblong, obtuse to subacute, 1.7–3 cm. long and 0.8–1.0 cm. wide.

Fig. 204. *Oncidium Powellii*

(539)

Petals spreading, with strongly undulate margins, subequal to the sepals or somewhat broader, the bases sessile, the blades rather obliquely oblong, obtuse to subacute, rich chocolate-brown with yellow margins and markings, 1.5–2.5 cm. long and 0.6–1.0 cm. wide. Lip pandurate, 3-lobed, shortly clawed at the base, 1.5–2 cm. long and 0.8–1.2 cm. wide, always distinctly shorter than the lateral sepals, the lateral lobes of the lip small, yellow, auriculate to subquadrate, truncate to subacute, the central portion of the lip contracted into a short, distinct, reddish brown isthmus, the mid-lobe bright yellow, quite variable in shape, usually shallowly emarginate, with a minute central apicule, the 2-lobed blade transversely reniform but sometimes only an obovate, obtuse, entire dilation of the isthmus, the disk with a prominent, yellow, multidenticulate callus, terminating at the apex in a broad, transverse, porrect, more or less verrucose or crenulate plate. Column 5–6 mm. long, without conspicuous lateral wings.

Panama.

CANAL ZONE: Gatún Lake, sea level, *Powell* 58; without definite locality, *Pring* s. n.; hills near Frijoles, sea level, *Powell* 3480. COCLÉ: vicinity of El Valle de Antón, 800 m., *Allen* 2895.

An apparently rare species, with very handsome chocolate-brown flowers, seemingly confined to the lowland forests of the Atlantic slope. It is very closely allied to the Colombian *O. anthocrene*, and may ultimately prove to be identical.

22. *ONCIDIUM PUSILLUM* (L.) Rchb. f. in Walp. Ann. 6:714. 1863.

Epidendrum pusillum L. Sp. Pl. ed. 2, 1352. 1763.

Cymbidium pusillum Sw. in Nov. Act. Soc. Upsal. 6:74. 1799.

Oncidium iridifolium HBK. Nov. Gen. & Sp. 1:344. 1815.

Dwarf, epiphytic herbs up to about 8 cm. tall, entirely without pseudobulbs. Leaves distichously spreading, forming a broad fan, equitant, linear, often falcate or ensiform, the apices obliquely acute, 2–6 cm. long and 0.4–1.0 cm. wide. Inflorescences 1 to about 6 erect or arching scapes, about equaling the leaves in length, the apices with several acute, strongly compressed, imbricating sheaths, forming a short, complanate raceme from the axils of which the flowers are produced in succession. Flowers large in relation to the size of the plant, averaging 2–2.5 cm. long and 1.8–2 cm. wide. Sepals free, spreading, bright yellow, the dorsal sepal erect, elliptic-lanceolate to subquadrate, obtuse, up to about 5 mm. long and 3–4 mm. wide, the dorsal surface with a pronounced keel, prolonged at the apex into an erect, acute spur, the lateral sepals linear-lanceolate, acuminate, very closely appressed to the under-surface of the lip, 4–5 mm. long and 1–1.5 mm. wide, the reverse surfaces with a strongly developed keel. Petals spreading, oblong, obtuse, with undulate margins, bright yellow irregularly barred with reddish brown, up to about 8 mm. long and 4 mm. wide. Lip broadly pandurate, 3-lobed, up to 1.8 cm. long and 2 cm. wide, bright yellow, the lateral lobes suborbicular to obovate-spatulate, obtuse, spreading, the central portion of the lip contracted into a short, broad isthmus, blotched with reddish brown, the mid-lobe

Fig. 205. *Oncidium pusillum*

abruptly dilated, with a deep central sinus, the lateral lobules broadly spreading, with undulate margins, the disk white, spotted reddish orange, with a spreading, subquadrate plate, terminating in a second broad, spreading, semi-orbicular plate with a short central keel and undulate margins. Column short, about 3 mm. long, with prominent, denticulate, lateral wings.

Mexico to Brazil and Bolivia; Trinidad.

CANAL ZONE: Las Cascadas Plantation, near Summit, *Standley 25761*, *Powell 3018*; San Juan, upper Chagres River, sea level, *Powell 3346*; drowned forest along the Río Chagres, upper Madden Lake area, *Steyermark & Allen 16771*; vicinity Salamanca Hydrographic Station, 80 m., *Woodson, Allen & Seibert 1559*; vicinity Alajuela, 90–100 m., Madden Dam area, *Dodge, Steyermark & Allen 16510*. PANAMÁ: Río La Maestra, between the Río Bayano and the Gulf of San Miguel, 0–25 m., *Allen 17*. BOCAS DEL TORO: Water Valley, vicinity Chiriquí Lagoon, *von Wedel 1383, 1474, 1482, 2153*; Western River, vicinity Chiriquí Lagoon, *von Wedel 2777*; Almirante Bay, *von Wedel 14*.

Attractive plants, with relatively large, bright yellow flowers, often found as colonies on old orange trees or scattered through the slender, twiggy ends of dead branches, often overhanging water. Widely distributed and common in the American tropics.

23. *ONCIDIUM STENOTIS* Rchb. f. in *Linnaea* 41:67. 1877.

Erect, epiphytic herbs with approximate, linear-oblong, compressed, longitudinally ridged, monophyllous pseudobulbs 7–14 cm. long and 2.5–4 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts the uppermost 3 of which are conspicuously foliaceous. Leaves and bract blades linear-oblong, obtuse to subacute, coriaceous, 15–60 cm. long and 2.5–5 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to many-flowered panicles up to about

1.5 m. in length, the lateral branches short, usually less than 15 cm. long, the 1 to 5 flowers subtended by thin, white, acuminate, papery bracts. Flowers of moderate size, 3-4 cm. in diameter. Sepals free, subequal, spreading, with recurved apices and undulate margins, yellow heavily blotched with brown, the dorsal sepal oblong-lanceolate, shortly acute to apiculate, 1.3-1.8 cm. long and 0.6-0.8 cm. wide, the lateral sepals linear-lanceolate to lanceolate, acute, obliquely deflexed, the reverse surfaces with a strong central keel, 1.5-2 cm. long and 0.5-0.7 cm. wide. Petals subequal to the sepals and similarly colored, spreading, with recurved apices and undulate margins, lanceolate, acute, 1.4-1.6 cm. long and 0.4-0.6 cm. wide. Lip pandurate, 3-lobed, distinctly shorter than the lateral sepals, 1.2-2 cm. long and 1.2-1.8 cm. wide, bright yellow with a brown isthmus, the lateral lobes shortly clawed at the base, spreading, obovate-spatulate, with subquadrate to sub-orbicular blades, the central portion of the lip contracted into a narrow isthmus, the mid-lobe abruptly dilated, emarginate and 2-lobed, often with a short central apicule, transversely subreniform in outline, about equaling the extended lateral lobes in width, the disk with an erect, fleshy callus, the sides with 2 or 3 short teeth, the apex abruptly tridenticulate. Column up to about 7 mm. long, with 2 rather obscure lateral lobes, the under-surface below the stigma conspicuously thickened into 2 parallel, fleshy lobules.

Costa Rica and Panama.

CHIRIQUEF: without definite locality, *Pring s. n.*, *Pring & Hunter s. n.* BOCAS DEL TORO: Water Valley, vicinity Chiriqui Lagoon, *von Wedel 1654, 1829, 2156.*

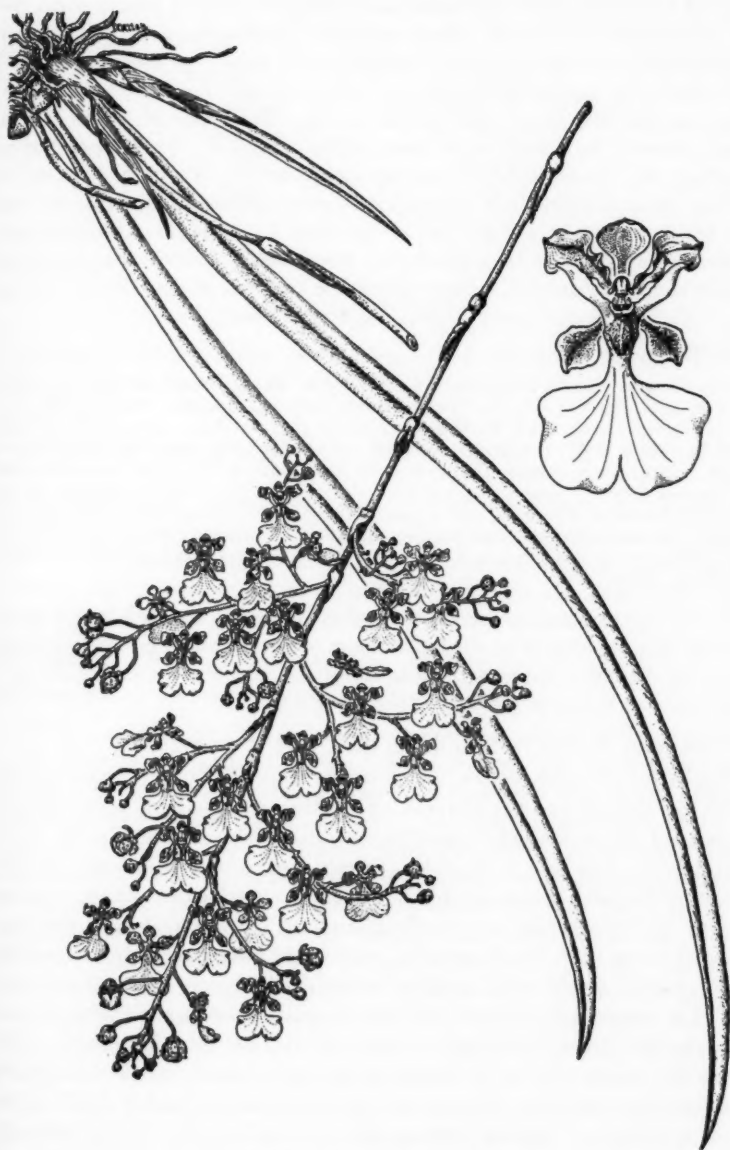
Allied to *O. Baueri*, but apparently always differing in the larger flowers, in which the lip is distinctly shorter than the lateral sepals, and with a conspicuously narrower isthmus. The smaller plants are nearly identical in vegetative appearance with those of *O. Powellii*, and have sometimes been mistaken for that species.

24. *ONCIDIUM STIPITATUM* Lindl. in Bot. Voy. Sulphur, 172. 1843.

Oncidium lacerum Lindl. in Bot. Reg. n. s. 7: Misc. 30. 1844.

Oncidium stipitatum Lindl. var. *platyonyx* Rehb. f. in Gard. Chron. 1:788. 1878.

Caespitose, epiphytic herbs with very short, subcylindric to subconic, monophyllous pseudobulbs 5-10 mm. long and 5-10 mm. wide, the broadly truncate apices with elongate, fleshy, terete, acuminate, longitudinally sulcate leaves, the pseudobulbs and leaf bases of the current season's growth enveloped in 4-6 closely imbricating, papery bracts which soon weather away. Leaves at first horizontal or ascending, becoming pendulous and wrinkled with age, often more or less spotted with reddish brown, 24-70 cm. long and 0.6-1.0 cm. in diameter. Inflorescences solitary, horizontal or ascending, many-flowered panicles usually about equaling the leaves in length, produced from the bases of the pseudobulbs. Flowers very variable in size, up to about 2.5 cm. long and 1.8 cm. wide, always brightly colored and attractive. Sepals subequal, free, spreading, shortly clawed at the base, yellow richly marked with reddish brown, the dorsal sepal obovate-spatulate, obtuse with a minute apicule, the blade slightly concave, 4.5-6 mm.

Fig. 206. *Oncidium stipitatum*

long and 2.5–4 mm. wide, the lateral sepals obliquely obovate, shortly acute, 5–7 mm. long and 3–4 mm. wide. Petals spreading, elliptic-oblong, obtuse, with undulate margins, colored and marked similarly to the sepals, 5–8 mm. long and 2–3 mm. wide. Lip pandurate, 3-lobed, 1–2 cm. long and 1–1.8 cm. wide, bright yellow on both the frontal and reverse surfaces, the basal half of the isthmus reddish brown, the lateral lobes linear-oblong, obliquely obtuse, spreading or ascending, the central portion of the lip contracted into a narrow isthmus, the mid-lobe abruptly dilated and 2-lobed, transversely semiorbicular to oblong, often with undulate margins, the disk at the base with a suborbicular transverse plate terminating at the apex in a prominent, erect, fleshy, semiorbicular, somewhat laterally compressed tubercle occupying only the basal half of the isthmus. Column 2–2.5 mm. long, with 2 narrow, spreading, lateral arms.

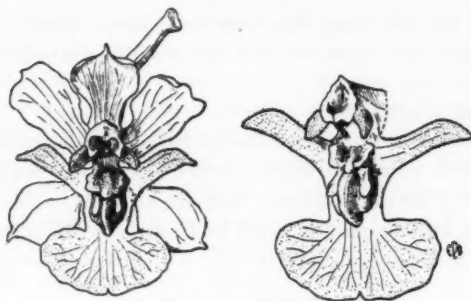
Panama.

CANAL ZONE: vicinity of Empire and Culebra Cut, 80 m., *Hunter & Allen 784*; Miraflores, sea level, *Powell 3207*; Las Cruces, *Powell 3222*; Las Cascadas, *Powell 3124*; Barro Colorado Island, Gatún Lake, *Woodworth & Vestal 529*; San Juan, upper Chagres River, 0–200 ft., *Powell 3137*. COLÓN: forests along the Río Boquerón, above the Peluca Hydrographic Station, Upper Madden Lake region, 90 m., *Hunter & Allen 654*. PANAMÁ: hills near Panama City and near Tapia, sea level, *Powell 220, 375*; vicinity Arraiján, *Powell 3209*; Chilibre River, *Piper s. n.*; coastal swamp along the Río Jagua, east of Panama City, sea level, *Hunter & Allen 472*; Cerro Campana, vicinity Campana, 2000 ft., *Fairchild s. n., Allen 4488*; vicinity Pacora, about 50 m., *Allen 819, 2933, 4451, 4457*; vicinity La Chorrera, 50 ft., *Allen 5168*.

A very common, attractive lowland species apparently confined to the central Isthmian area, particularly on the Pacific slope, where the plants are very abundant in areas of deciduous forest, with spontaneous seedlings often spreading to cultivated trees and shrubs of the Canal Zone town sites.

25. *ONCIDIUM TERES* A. & S. in Sched. Orch. 8:78, *t.* 7. 1925.

Epiphytic herbs with slender, fleshy, terete, longitudinally sulcate leaves. Inflorescences paniculate, many-flowered, up to about 4.5 dm. long, produced from the bases of the rudimentary, subcylindric pseudobulbs. Flowers small, up to about 1.5 cm. long and 1 cm. wide. Sepals free, subequal, spreading, shortly clawed at the base, obovate-spatulate, the blades suborbicular, obtuse, concave, minutely apiculate, yellow very heavily spotted reddish brown, about 6 mm. long and 3.5–4.5 mm. wide. Petals spreading, marked and colored similarly to the sepals, oblong-obovate, obtuse, with undulate margins, 5.2–6 mm. long and 3–4 mm. wide. Lip panduriform, 3-lobed, 7–8 mm. long and 6.5–8 mm. wide, the frontal surface bright yellow, the reverse surface and the disk heavily spotted reddish brown, the lateral lobes small, ligular or oblong-spatulate, obtuse to obliquely acute, minutely puberulent, antrorse in natural position, the central portion of the lip contracted into a distinct isthmus, the mid-lobe abruptly dilated, obscurely 2-lobed, transversely reniform, sometimes porrect in natural position, the disk with

Fig. 207. *Oncidium teres*

a prominent, complex, fleshy, tuberculate callus, occupying nearly the entire isthmus. Column about 3 mm. long, with 2 lateral, acute, incurving wings.

Panama.

VERAGUAS: vicinity San Francisco de Veraguas, 1000 ft., Powell 383. CHIRIQUÍ: vicinity David, 100 ft., Allen 4242, 4453.

A small-flowered lowland species thus far known only from Chiriquí and Veraguas provinces in western Panama. The plants are vegetatively identical with those of *Oncidium stipitatum*, but the flowers differ in the shorter isthmus of the lip, the much more prominent and complex basal callus, the reddish brown spotting on the reverse surface of the lip, and in other characters.

26. *ONCIDIUM WARSCEWICZII* Rchb. f. in Bot. Zeit. 10:693. 1852.

Oncidium bifrons Lindl. in Gard. Chron. 84. 1857.

Erect, caespitose, epiphytic herbs with approximate, elliptic-ovoid, compressed, usually diphyllous pseudobulbs 4–8 cm. tall and 2–3 cm. wide, the bases enveloped in several conduplicate, imbricating bracts, the uppermost bract being conspicuously foliaceous. Leaves ligular, obtuse to subacute, subcoriaceous, 15–30 cm. long and 1.5–3.5 cm. wide, contracted below into slender, conduplicate petioles. Inflorescence a solitary, erect or arching, 4- to 12-flowered, unilateral raceme exceeding the leaves, up to about 5 dm. long, produced from the axil of the uppermost foliaceous bract. Flowers of moderate size, about 3 cm. in diameter, uniformly yellow throughout, the elongate pedicels subtended by conspicuous, papery, spathaceous bracts. Sepals dissimilar, the dorsal sepal free, oblong, obtuse, with slightly undulate margins, 10–12 mm. long and 5–6 mm. wide, the lateral sepals connate nearly to the apex, forming a single obovate, bifid segment below the lip, the lower surface with 2 distinct keels, 1.4–1.6 cm. long and 0.7–0.9 cm. wide. Petals obliquely oblong, obtuse, with slightly undulate margins, 1.2–1.4 cm. long and 0.7–0.8 cm. wide. Lip subpandurate, obscurely 3-lobed, 1.5–1.8 cm. long and 1.5–1.8 cm. wide at the apex, the lateral lobes reduced to inconspicuous auricles, the basal half of the lip nearly oblong, the apical half abruptly dilated and 2-lobed, reniform, about twice as wide as the basal half, the disk with a nar-

row, fleshy crest, the base under the column semiterete, terminating at the apex in 5 short, divergent teeth. Column 8–10 mm. long, the apex dilated, with narrow lateral wings.

Costa Rica and Panama.

Originally described from plants collected by von Warscewicz, presumably on the slopes of Chiriqui Volcano, at 8000–10,000 ft. elevation. Although the species is not represented in recent collections from our area, its frequent occurrence in the adjacent Costa Rican highlands would lend weight to the supposition that this one citation may be authentic.

DOUBTFUL SPECIES

ONCIDIUM ADVENA Rchb. f. in Hamb. Gartenzeit. 16:422. 1860.

Originally described from flowering material only, from plants presumably imported from Venezuela. An Endres collection is cited by Kränzlin, from the vicinity of the old Obispo railway station, in the Canal Zone. The figure given of a single flower looks like *Oncidium ensatum*. Absent from all recent collections.

ONCIDIUM ONUSTUM Lindl. Gen. & Sp. Orch. Pl. 203. 1833.

A poorly known South American species, sometimes doubtfully listed as occurring in Panama. Absent from all recent collections.

ONCIDIUM PELIOGRAMA Linden & Rchb. f. in Gard. Chron. 1451. 1871.

Described from flowers only. On the basis of the sketch of the type in the Ames Herbarium, the species which we list as *Oncidium stenotis* might possibly be referable to this concept, but the drawing is too poor for positive identification. In the absence of authentic material for comparison, or even any description of vegetative parts, it seems best to exclude it as a species of doubtful identity.

79. *LEOCHILUS* Knowles & Westcott

LEOCHILUS Knowles & Westc. Fl. Cab. 2:143. 1838; Benth. & Hook. Gen. Pl. 3:564. 1883; Kränzlin in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):291. 1922.

Cryptosanus Scheidw. in Otto & Dietr. Allg. Gartenzeit. 11:101. 1843.

Rhynchostele Rchb. f. in Bot. Zeit. 10:770. 1852.

Cryptosaccus Scheidw. ex Rchb. f. Xenia Orch. 1:15. 1854.

Leiochilus Benth. in Jour. Linn. Soc. 18:328. 1881, non Hook.

Waluwia Regel, in Gartenfl. 40:89, t. 1341. 1891.

Rhynchostelis Jackson, in Index Kew. 2:718. 1895, sphalm.

Small, caespitose, epiphytic herbs with short, compressed, monophyllous or rarely diphyllous pseudobulbs, the lower portions enveloped in several membranaceous or foliaceous sheaths. Leaves elliptic-lanceolate to ligular, coriaceous, contracted below into a petiole. Inflorescences 1 or 2 erect or arching racemes or panicles produced from the lateral bases of the pseudobulbs. Flowers small. Sepals subequal, spreading, free, or more or less connate. Petals subequal to the sepals or sometimes broader. Lip entire or 3-lobed, adnate to the base of the

column, spreading, usually longer than the lateral sepals, the disk fleshy or callous. Column short, erect, not laterally winged but usually biauriculate below the stigma, the clinandrium truncate, the rostellum elongate, the base of the column without a foot. Anther terminal, operculate, incumbent, 1-celled, produced in front into a hooded appendage; pollinia 2, waxy.

A small genus of tropical American epiphytes closely allied to *Oncidium*, ranging from Mexico and the West Indies to northern Argentina. Two species are known from Panama.

- a. Lateral sepals connate for more than half their length..... 1. *L. LABIATUS*
 aa. Lateral sepals free..... 2. *L. SCRIPTUS*

1. *LEOCHILUS LABIATUS* (Sw.) O. Ktze. Rev. Gen. Pl. 2:656. 1891 (as *Leiochilus*).

Epidendrum labiatum Sw. Prodr. Veg. Ind. Occ. 124. 1788.

Liparis labiata Spr. Syst. Veg. 3:741. 1826.

Rodriguezia cochlearis Lindl. in Ann. & Mag. Nat. Hist. 5:116. 1840.

Leochilus cochlearis Lindl. in Bot. Reg. n. s. 5: Misc. 23. 1842.

Oncidium labiatum Rehb. f. in Walp. Ann. 6:741. 1863.

Dwarf, epiphytic herbs 4-9 cm. tall, with elliptic oblong, compressed, monophyllous pseudobulbs 10-15 mm. long and 5-8 mm. wide, the bases with 2-3 foliaceous bracts, the leaves and pseudobulbs often reddish brown. Leaves and bract blades elliptic-lanceolate to ligular, obtuse to subacute, coriaceous, 2-6 cm. long and 0.6-1.5 cm. wide. Inflorescences 1 or 2 slender, erect, few-flowered racemes or shortly branching panicles much exceeding the leaves in length, 4-25 cm. long. Flowers small, averaging about 1 cm. in diameter. Sepals of about equal length, yellow striped or spotted reddish brown, the dorsal sepal free, elliptic-lanceolate, shortly acuminate, deeply concave, 3-5 mm. long and 1.5-2 mm. wide, the lateral sepals connate to above the middle, forming a single bifid segment below the lip, 4-6 mm. long and 2.5-3 mm. wide, with 2 distinct keels on the lower surface. Petals subequal to the dorsal sepal and similarly colored, elliptic-oblong, subacute, with distinct central keels on the reverse surfaces, 3-5 mm. long and 2-3 mm. wide. Lip entire, slightly concave, yellow with a red or reddish brown spot at the base, oblanceolate, obtuse or sometimes slightly retuse, the blade with an obscure median constriction, 5-8 mm. long and 2.5-4 mm. wide, the disk with an erect, bicarinate, fleshy callus. Column 1-1.5 mm. long, semiterete, without lateral wings but with 2 short, porrect teeth below the stigma.

Antilles, Panama, and Trinidad.

COCLÉ: El Valle de Antón, 800 m., Allen 2295.

A dwarf species, fairly frequent on calabash trees in cultivated plots, the plants being rendered conspicuous by the reddish brown leaves and pseudobulbs. Our specimens are nearly identical with typical West Indian material, but differ considerably from specimens of *Leochilus gracilis* Schltr. from Guatemala, Honduras, and Costa Rica, which would seem to be distinct. In *L. labiatus* the plants are

from 4-9 cm. in height, with elongate scapes up to 25 cm. long, the flowers averaging slightly larger, with the lateral sepals connate to above the middle; while in *L. gracilis* the plants seem to be 2-4.5 cm. tall, the scapes only up to about 6 cm. long, with the lateral sepals entirely free.

2. *LEOCHILUS SCRIPTUS* (Scheidw.) Rchb. f. *Xenia Orch.* 1:15, *t.* 6. 1854.

Cryptosanus scriptus Scheidw. in Otto & Dietr. *Allg. Gartenzeit.* 11:101. 1843.

Oncidium scriptum Rchb. f. in Walp. *Ann.* 6:772. 1863.

Leochilus major Schltr. in Fedde *Rep. Sp. Nov.* 15:209. 1918.

Leochilus Powellii Schltr. loc. cit. 17:81. 1922.

Leiochilus retusus Schltr. loc. cit. 19:256. 1923.

Erect, caespitose, epiphytic herbs with approximate, oblong-ovoid to elliptic-oblong, compressed pseudobulbs 2-5 cm. long and 1-2.5 cm. wide, the truncate apices usually monophyllous, the lower portions of the pseudobulbs enveloped in the conduplicate bases of the several distichously imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves ligular, obtuse or shortly and unequally 2-lobed at the apex, coriaceous, 5.5-14 cm. long and 1-2.8 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences 1 or 2 erect or arching, few- to about 12-flowered racemes or weakly branching panicles, equaling or somewhat exceeding the leaves, up to about 25 cm. in length. Flowers relatively large for the genus, averaging about 1.5-2 cm. in diameter, greenish white to greenish yellow with purple or reddish brown markings. Sepals free, subequal, spreading, the dorsal sepal elliptic-lanceolate, acute, somewhat concave, the reverse surface with a distinct keel, 9-12 mm. long and 3.5-5 mm. wide, the lateral sepals spreading or somewhat reflexed, ligular to oblong-lanceolate, obtuse to subacute, 8-12 mm. long and 2.5-5 mm. wide, the reverse surfaces with a distinct central keel. Petals subequal to the dorsal sepal, lanceolate, acute, 9-12 mm. long and 2.5-3.5 mm. wide. Lip entire, spreading or slightly convex, the blade obovate-oblong, truncate, up to about 12 mm. long and 7 mm. wide, the narrower base conspicuously thickened and adnate to the base of the column, the broader apex shallowly emarginate, the reverse surface with a distinct central keel, the disk with a short, subquadrate, basal boss terminating at the apex in 2 distinct, parallel, erect, fleshy, puberulent calli. Column up to about 3 mm. long, semiterete, the under-surface below the stigma with 2 distinct, ligular, porrect arms.

Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: Las Cascadas, sea level, *Powell* 3140, *Standley* 25755, 29700; vicinity Gatún, *H. Butcher* s. n. PANAMÁ: Juan Díaz Range, sea level, *Powell* 129; Arraiján, *Powell* 3128, 3206; Río La Maestra, 0-25 m., *Allen* 50; vicinity Chepo, 30 m., *Allen* 2355.

80. *SIGMATOSTALIX* Rchb. f.

SIGMATOSTALIX Rchb. f. in *Bot. Zeit.* 10:769. 1852; Benth. & Hook. *Gen. Pl.* 3:565. 1883; Schltr. in Fedde *Rep. Sp. Nov.* 15:142. 1918.

Ornithophora Barb. Rodr. *Gen. & Spec. Orch.* Nov. 2:225. 1882.

Small, caespitose, epiphytic herbs with approximate, elliptic-oblong to ovoid, compressed, monophyllous or rarely diphyllous pseudobulbs, the lower portions partially enveloped in several distichously imbricating bracts the uppermost 2 to 5 of which are usually foliaceous. Leaves linear to elliptic-lanceolate, subcoriaceous to coriaceous. Inflorescences 1 to about 5 erect or arching, few- to many-flowered racemes or panicles about equaling or sometimes much exceeding the leaves in length, produced from the axils of the foliaceous bracts. Flowers small to minute. Sepals subequal, free, or with the laterals shortly connate at the base. Petals subequal to the sepals. Lip usually with an elongate claw, sometimes subsessile, the blade entire or 3-lobed, subquadrate, suborbicular or trulliform. Column slender, elongate, often somewhat arcuate, the apex more or less dilated opposite the stigma. Anther terminal, operculate, incumbent, 1-celled; pollinia 2, waxy.

A small genus of tropical American epiphytes, ranging from Mexico to Brazil. Four species are known to occur in Panama.

- a. Lip subsessile, without an elongate claw at the base.
 - b. Basal callus of the lip subquadrate, with a deep longitudinal excision on each side of the central concavity..... 4. *S. RACEMIFERA*
 - bb. Basal callus of the lip transversely subreniform, bifid, with a rounded tubercle in the center of each of the lateral lobules..... 3. *S. HYMENANTHA*
- aa. Lip with a distinct, elongate claw at the base.
 - b. Blade of the lip subquadrate, without distinct auriculate lobules at the base..... 1. *S. ABORTIVA*
 - bb. Blade of the lip ovate-sagittate to cordate, with 2 distinct auriculate lobules at the base..... 2. *S. GUATEMALENSIS*

1. *SIGMATOSTALIX ABORTIVA* L. Wms. in Ann. Mo. Bot. Gard. 27:284, *t.* 34, *figs.* 1-6. 1940.

Dwarf, caespitose, epiphytic herbs, with oblong-elliptic, compressed, monophyllous pseudobulbs 12-20 mm. long and 3-11 mm. wide, enveloped below in the conduplicate, distichously imbricating bases of 2 foliaceous bracts. Leaves and bract blades narrowly linear-ligular to elliptic-lanceolate, acute, subcoriaceous, 2-4 cm. long and 0.5-1.0 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences usually solitary, slender, arching, few-flowered racemes up to about 10 cm. long. Flowers minute, averaging about 5 mm. in length. Sepals subequal, free, spreading or reflexed, yellow, lanceolate, acute, about 3.2 mm. long and 0.8-1 mm. wide. Petals somewhat broader than the sepals, yellow, elliptic-lanceolate to oblanceolate, subacute and obscurely apiculate, about 3.2 mm. long and 1.3 mm. wide. Lip with an elongate claw at the base, obovate-spatulate, white, about 5 mm. long and 3.5 mm. wide, the abruptly dilated blade truncate at the apex, subquadrate to suborbicular in outline, the disk with a fleshy, cucullate callus covering the entire upper surface of the claw, the obtuse apex abruptly erect. Column slender, about 3 mm. long, dilated at the apex.

Panama.

COLÓN: Quebrada Lopez, lower slopes of Cerro Santa Rita, 30 m., *Allen 2121*.



Fig. 208. *Sigmatostalix guatemalensis*

(550)

2. *SIGMATOSTALIX GUATEMALENSIS* Schltr. in Fedde Rep. Sp. Nov. 10:253. 1911.*Sigmatostalix costaricensis* Rolfe in Kew Bull. 78. 1916; Bot. Mag. t. 8825. 1919.*Sigmatostalix poikilostalix* Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 80):310, fig. 27, D:a-e. 1922.

Caespitose, epiphytic herbs with approximate, elliptic-oblong, compressed, monophyllous pseudobulbs 1.5–3.5 cm. long and 0.6–1.5 cm. wide, partially enveloped below in the conduplicate bases of several distichously imbricating bracts the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves and bract blades ligular to elliptic-lanceolate, acute, subcoriaceous, 3.5–12 cm. long and 0.8–1.5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 slender, erect, few- to many-flowered racemes, usually much exceeding the leaves in length, 11–32 cm. long, produced from the axils of the uppermost foliaceous bracts. Flowers relatively large for the genus, averaging about 12–15 mm. in diameter when spread out. Sepals free, subequal, usually strongly reflexed, pale green to yellow, usually marked with brown, ligular-lanceolate, acute, 6–9 mm. long and 1.5–2.5 mm. wide. Petals subequal to the sepals and similarly colored, usually strongly reflexed, rather obliquely lanceolate, acute, 6–9 mm. long and 2–3 mm. wide. Lip with a distinct, narrow, fleshy claw at the base, 2–3 mm. long, produced in front into a short, subacute spur, the blade of the lip abruptly dilated, rather obscurely 3-lobed, spreading or slightly convex, broadly trulliform, ovate-sagittate to cordate, usually reddish brown with a dark yellow apex, rarely entirely yellow, 5–6 mm. long and 4–5 mm. broad, the lateral lobules small, auriculate or with subfalcately acute, incurving projections from the posterior margin, the apex of the blade obtuse to acute, with a short, distinct, central keel on the under-side. Column elongate, slender, somewhat arcuate, up to about 6 mm. long, the lower portion terete, the apex shortly dilated on either side of the stigma, the base without a foot.

Mexico, Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 5000 ft., Powell 230.

3. *SIGMATOSTALIX HYMENANTHA* Schltr. in Beih. Bot. Centralbl. 36²:419. 1918.

Small, caespitose, epiphytic herbs with approximate, ovoid to elliptic-oblong, compressed, monophyllous pseudobulbs 1.2–3.5 cm. long and 0.8–2 cm. wide, the lower portions partially enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 2 or 3 of which are conspicuously foliaceous. Leaves and bract blades linear-ligular, acute, subcoriaceous, 3.5–14 cm. long and 0.4–0.8 cm. wide, contracted below into narrow, conduplicate petioles. Inflorescences 1 or 2 slender, erect, shortly branching panicles, usually about equaling the leaves in length, produced from the axils of the uppermost foliaceous bracts, the lateral branches of the panicles usually very short and densely bracteate. Flowers minute. Sepals and petals oblong, acute, about 2 mm. long and 0.5 mm. wide. Lip obscurely 3-lobed, about 1.5 mm. long and 2 mm. wide, subsessile or obscurely

clawed at the base, the blade broadly ovate, obtuse, spreading or slightly convex, the disk with a fleshy, 2-lobed, transversely subreniform callus, with an obscure, rounded tubercle in the center of each of the lateral lobules. Column stout, terete, erect, slightly dilated at the apex, about 1.5 mm. long, the base without a foot.

Costa Rica and Panama.

DARIÉN: vicinity Chepigana, Cana-Cuasi trail, 2000 ft., *Terry & Terry 1437*.

4. *SIGMATOSTALIX RACEMIFERA* L. Wms. in Ann. Mo. Bot. Gard. 27:285, *t.* 36. 1940.

Small, caespitose, epiphytic herbs 7–15 cm. tall, with elliptic-oblong, compressed, monophyllous pseudobulbs 2–3.5 cm. long and 1–2 cm. wide, the lower portions enveloped in the conduplicate, distichously imbricating bases of several bracts, the uppermost 3 to 5 of which are conspicuously foliaceous. Leaves and bract blades linear-ligular to elliptic-lanceolate, acute, subcoriaceous, 3–13 cm. long and 0.5–1.8 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 to 5, slender, erect or arching, few- to many-flowered, shortly branching panicles about equaling or somewhat exceeding the leaves in length, produced from the axils of the foliaceous bracts. Flowers small. Sepals subequal, spreading or reflexed, greenish white, the dorsal sepal free, lanceolate, acute, about 3 mm. long and 0.75 mm. wide, the lateral sepals shortly connate at the base, elliptic-lanceolate, acute to shortly acuminate, about 2.5 mm. long and 0.8 mm. wide. Petals somewhat broader than the sepals, greenish-white spotted maroon, elliptic-lanceolate, acute, about 3 mm. long and 1.25 mm. wide. Lip subsessile or obscurely clawed at the base, the blade subquadrate, truncate, with a distinct median constriction, orange, about 3 mm. long and 3.5 mm. wide, the disk with a fleshy, subquadrate callus, with a deep longitudinal excision on each side of the central linear concavity. Column elongate, slender, about 5 mm. long, terete below, dilated above, with 2 acute auricles on each side of the stigma.

Panama.

COCLÉ: hills north of El Valle de Antón, 800–1000 m., *Allen 1232, 2266, 2744, 2878, 3745*.

81. *LOCKHARTIA* Hook.

LOCKHARTIA Hook. in Bot. Mag. *t.* 2715. 1827; Benth. & Hook. Gen. Pl. 3:570. 1883; Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):6. 1923.

Fernandezia R. & P., sensu Lindl. Gen. & Sp. Orch. Pl. 207. 1833, in part.

Caespitose, epiphytic herbs without pseudobulbs, the linear, undivided, pseudomonopodial, foliaceous stems erect or pendulous, entirely enveloped in the short, equitant, distichously imbricating, coriaceous leaves. Inflorescences short 1- or 2-flowered scapes or sometimes abbreviated few-flowered panicles, produced from the upper leaf axils. Flowers of moderate size to small, usually yellow, on elongate, filiform pedicels, often subtended by conspicuous membranaceous bracts. Sepals

subequal, free, spreading or with the laterals reflexed. Petals subequal to the sepals or broader. Lip usually complexly 3-lobed, rarely entire, usually conspicuously exceeding the sepals in length, the lateral lobes (if present) often linear, rather long, divaricate or antrorsely incurving, the mid-lobe variously 2- to 4-lobulate, the disk with a papillose, denticulate or tuberculate callus. Column very short, with two broad wings or auricles, the base without a foot. Anther terminal, operculate, incumbent, imperfectly 2-celled; pollinia 2, waxy.

A rather perplexing genus of perhaps 30 species of American epiphytes, ranging from Mexico to Peru and Brazil. Six species, and one variety, are known to occur in Panama.

- a. Inflorescences relatively large, spreading, divaricate panicles..... 1. *L. ACUTA*
- aa. Inflorescences very short, compact, subsessile panicles or 1- to 2-flowered scapes.
 - b. Lip entire or subentire, without distinct linear lobes at the base. Inflorescences 1-flowered.
 - c. Leaves acute. Apex of the lip deeply emarginate..... 7. *L. PITTIERI*
 - cc. Leaves broadly obtuse. Apex of the lip entire..... 5. *L. OBTUSATA*
 - bb. Lip with distinct linear lobes at the base. Inflorescences 1-flowered or shortly racemose or paniculate.
 - c. Flowers very small, the lip usually less than 4 mm. long. Leaves obliquely truncate or obtuse at the apex..... 4. *L. MICRANTHA*
 - cc. Flowers relatively large, the lip 7 mm. long or more. Leaves acute or subacute at the apex.
 - d. Mid-lobe of the lip subquadrate, conspicuously broader at the apex than at the base, with a distinct isthmus or constriction between the apical portion and the smaller lateral lobules..... 6. *L. OERSTEDII*
 - dd. Mid-lobe of the lip either subquadrate or conspicuously broader at the base than at the apex.
 - e. Mid-lobe subquadrate, composed of 4 distinct or obscure, subequal lobules..... 2. *L. AMOENA*
 - ee. Mid-lobe quadrate-triangular, more or less distinctly 3-parted..... 3. *L. AMOENA* var. *TRIANGULABIA*

1. *LOCKHARTIA ACUTA* (Lindl.) Rchb. f. in Bot. Zeit. 10:767. 1852.

Fernandezia acuta Lindl. in Bot. Reg. 21: t. 1806. 1836.

Lockbartia pallida Rchb. f. in Bonplandia 2:14. 1854.

Caespitose, epiphytic herbs with flattened, pendulous, foliaceous stems, 15-50 cm. long and 1-2 cm. wide. Leaves, as normally seen in profile, rather obliquely triangular, acute or sharply apiculate at the apex, coriaceous, 12-30 mm. long and 4-10 mm. wide. Inflorescences usually 1 to 3 relatively large, spreading, divaricate, few- to many-flowered panicles up to about 8 cm. long, produced from the subterminal leaf axils. Flowers small, white with a yellow lip, less than 10 mm. in diameter when spread out, on slender filiform pedicels subtended by small, subcordate, papery bracts. Sepals free, subequal, spreading, ovate, obtuse, concave, 3-4 mm. long and about 2 mm. wide. Petals elliptic-oblong, obtuse, 4-5 mm. long and about 2 mm. wide. Lip more or less rectangular in outline, about 6 mm. long and 4 mm. wide, the basal half subquadrate, slightly concave, with narrow, erect, lateral margins, the sessile base adnate to the base of the column, the mid-lobe 4-parted, usually somewhat reflexed, the lateral lobules acute, spreading or

Fig. 209. *Lockbartia acuta*

(554)

divaricately extrorse, the projecting central lobule oblong to subquadrate, the apex deeply emarginate, the disk with a bifid, puberulent callus, the concave base under the column with a minute, semiglobose, densely papillose, shortly stipitate process. Column very short, 1–1.5 mm. long, with broadly spreading triangular or auriculate wings on each side of the stigma, the base without a foot.

Panama, Colombia, Venezuela, and Trinidad.

CANAL ZONE: Pedro Miguel, sea level, *Powell* 3051; upper Chagres River, Madden Lake region, 70–75 m., *Steyermark* 17515. PANAMÁ: hills near Panama City, sea level, *Powell* 52; forests of Juan Díaz, near Panama City, 20–50 m., *Pittier* 2551; Chiva-Chiva, sea level, *Powell* 3014, 3019; San José Island, Perlas Archipelago, *Johnston* 1217. COLÓN: Río Gatuncillo, vicinity Santa Rosa, 25 m., *Allen* 4253.

A common lowland species with very small flowers, readily recognizable by the relatively long, pendulous, foliaceous stems and the conspicuous, broadly paniculate inflorescences.

2. *LOCKHARTIA AMOENA* Endres & Rehb. f. in Gard. Chron. 666. 1872.

Lockhartia costaricensis Schltr. in Fedde Rep. Sp. Nov. 3:81. 1906.

Lockhartia-grandibracteata Kränzl. in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):15. 1923.

Caespitose, epiphytic herbs with erect or pendulous, flattened, foliaceous stems 12–40 cm. long and 1.4–2.5 cm. wide. Leaves narrowly triangular in profile, subacute, coriaceous, 1.5–3.5 cm. long and 0.4–1.0 cm. wide. Inflorescences short, compact, few-flowered panicles, up to about 3 cm. long. Flowers relatively large for the genus, on long filiform pedicels subtended by conspicuous, ovate-cordate, membranaceous bracts. Sepals free, subequal, slightly concave, yellow, the dorsal sepal erect or somewhat reflexed, ovate, obtuse, with a minute, terminal apicule, 5–6 mm. long and about 4 mm. wide, the lateral sepals strongly reflexed in natural position, elliptic-lanceolate, subacute, 5–6 mm. long and about 4 mm. wide. Petals somewhat longer than the sepals, yellow, elliptic-oblong, obtuse, incurving, the lateral margins conduplicate reflexed in natural position, 5–7 mm. long and about 4 mm. wide when spread out. Lip complexly 3-lobed, yellow, with reddish brown markings at the base, about 10 mm. long and 8 mm. wide, the lateral lobes linear-ligular, acute, antrorsely incurving in natural position, the mid-lobe subquadrate, distinctly or obscurely 4-lobulate, with undulate margins, the truncate apex with a deep central sinus, the basal lobules equaling or somewhat exceeding the 2-parted mid-lobule in width when spread out, very strongly reflexed in natural position, the disk with a linear, truncate, papillose callus. Column very short, with broadly spreading, lateral wings.

Costa Rica and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen* 2313; mountains beyond La Pintada, 400–600 m., *Hunter & Allen* 586. CHIRIQUÍ: Palo Alto Hill, 4000–5000 ft., *Powell* 362; vicinity Casita Alta, Finca Lérída, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert* 966.

A variable and rather perplexing highland species with relatively large, attractive flowers. It is probably allied to *L. Oerstedii*, but differs in the mid-lobe of the lip, which is more or less subquadrate and 4-lobulate, the basal half equaling or exceeding the apical half in width.

3. *LOCKHARTIA AMOENA* Endres & Rchb. f. var. *TRIANGULABIA* C. Schweinf. & P. H. Allen in Bot. Mus. Leaflet. Harv. Univ. 13:150. 1948.

Lockhartia triangulabia A. & S. in Sched. Orch. 8:80. 1925.

Vegetative parts and inflorescences apparently as in the type. Sepals subequal, free, probably more or less reflexed in natural position, about 5.4 mm. long and 3 mm. wide, the dorsal sepal ovate, subacute, the lateral sepals rather obliquely elliptic-oblong, obtuse, all three sepals dorsally mucronate at the apex. Petals oblong, obtuse, about 5.4 mm. long and 3 mm. wide. Lip broadly quadrate-triangular in outline, complexly 5-lobulate, about 7.2 mm. long and 10 mm. wide at the base, the lateral lobes rather obliquely ligular, obtuse, the mid-lobe more or less 3-parted, the basal lobules triangular, the basal half of the mid-lobe about twice as wide as the subquadrate, emarginate apical half, the disk with a linear-oblong, minutely papillose callus, the base under the column thickened into a semiorbicular minutely papillose boss.

Panama.

CHIRIQUI: without definite locality, 4000-5000 ft., *Powell 362-A*.

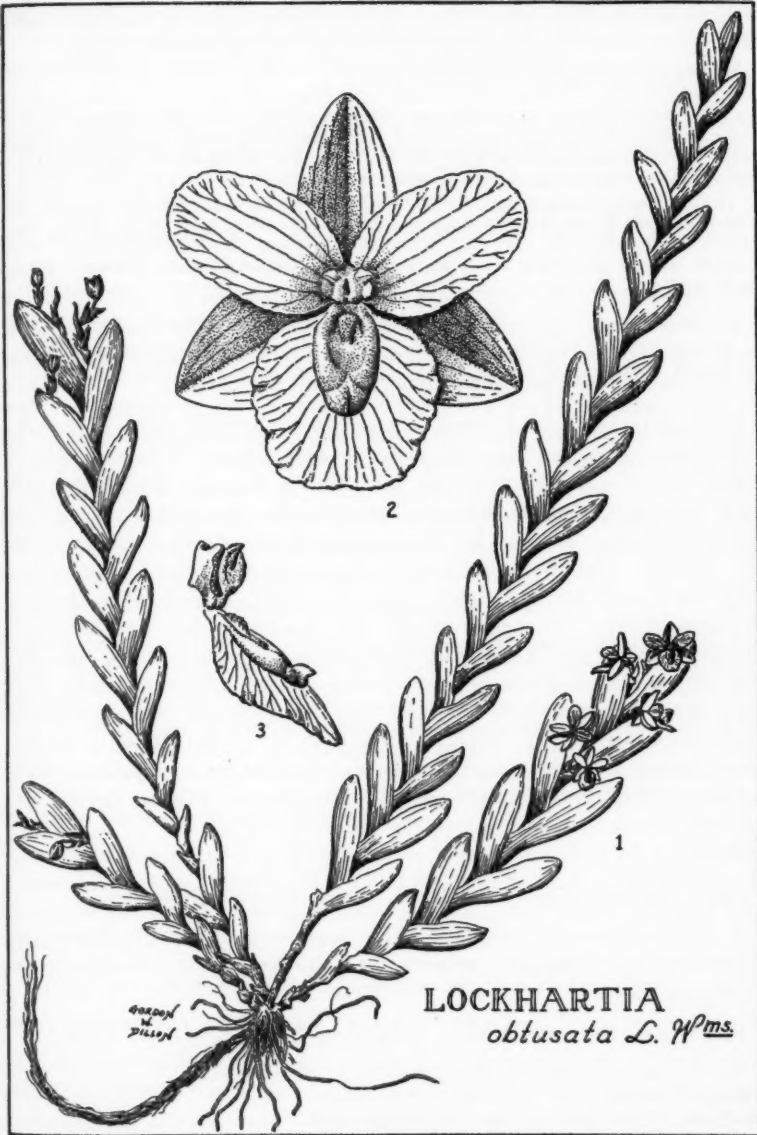
Lockhartia amoena, as represented by the quite numerous specimens available for study, exhibits a distinct tendency to vary from a condition in which the basal and apical halves of the 4-parted mid-lobe are of subequal width, to one in which the bifid, apical segment is considerably narrower. Our present single specimen apparently represents an extreme example of this tendency and seems sufficiently distinctive to warrant varietal rank.

4. *LOCKHARTIA MICRANTHA* Rchb. f. in Bot. Zeit. 10:768. 1852.

Lockhartia chiriquiensis Schltr. in Fedde Rep. Sp. Nov. 12:215. 1913.

Lockhartia Lankesteri Ames, in Sched. Orch. 5:36. 1923.

Caespitose, epiphytic herbs with erect or pendulous, flattened, foliaceous stems typical of the genus, 5-40 cm. long and 1-2 cm. wide. Leaves equitant, coriaceous, in profile narrowly triangular with obliquely truncate or obtuse apices, 0.8-2 cm. long and 0.35-1.0 cm. wide. Inflorescences simple 1- to 3-flowered scapes or abbreviated, few-flowered panicles up to about 2 cm. long, produced from the central or subterminal leaf axils. Flowers small, yellow, on slender, filiform pedicels subtended by ovate-cordate, membranaceous bracts. Sepals subequal, free, spreading, concave, ovate to elliptic-oblong, acute and apiculate, 2.5-4 mm. long and 2-3 mm. wide. Petals broadly ovate to elliptic-ovate, obtuse, 2.5-4 mm. long and 1.5-2 mm. wide. Lip complexly 3-lobed, 2.5-5 mm. long and 2.5-5 mm. wide, the lateral lobes linear-ligular, obtuse, spreading or reflexed, the mid-lobe

Fig. 210. *Lockhartia obtusata*

rhombic-obovate to obovate, the lateral margins obscurely lobulate, the apex deeply retuse, the disk with a low, slightly concave, more or less bifid callus. Column very short, with spreading lateral wings, the base without a foot.

Nicaragua to Surinam (fide Kränzlin).

CANAL ZONE: Balboa, on mango tree, *Standley 25494*; Río Pedro Miguel, near East Paraiso, *Standley 29984*; Las Cruces, *Powell 3189*; Miraflores, *Powell 3203*; Pedro Miguel, *Powell 3049*; drowned forests of the Quebrada Tranquilla, Madden Lake region, *Dodge & Allen 17325*; Río Indio, Madden Lake region, *Steyermark & Allen 17437, 17440*. PANAMÁ: Río La Maestra, coastal area east of the Río Bayano, 0-25 m., *Allen 61*. COCLÉ: hills north of El Valle de Antón, 1000-1200 m., *Allen 2318, 2903, 3420, 3939, 4259*. VERA-GUAS: vicinity Santa Fé, 1000 ft., *Allen 4429*; vicinity Bahía Honda, *Taylor 1510*. CHIRIQUÍ: vicinity San Felix, 0-120 m., *Pittier 5286*; without definite locality, 4000 ft., *Powell 3476*.

A common small-flowered species somewhat reminiscent of *Lockhartia acuta*, but distinguished by the usually shorter foliaceous stems, much shorter inflorescences, yellow flowers, and differently shaped lip.

5. *LOCKHARTIA OBTUSATA* L. Wms. in Amer. Orch. Soc. Bull. 9:209, t. 8. 1941.

Caespitose, epiphytic herbs with broad, strongly flattened, foliaceous stems up to about 35 cm. tall and 2.5-3.5 cm. wide. Leaves equitant, distichously imbricating, coriaceous, obliquely oblong as seen in profile, obtuse, 2-4 cm. long and 0.5-1.0 cm. wide. Inflorescences short, condensed racemes from the upper leaf axils. Flowers relatively large and attractive, bright yellow with a conspicuous orange callus at the base, apparently produced singly in succession from the terminal cluster of ovate, acute, papery bracts. Sepals subequal, free, spreading, ovate, obtuse to shortly acute, minutely apiculate, about 9 mm. long and 6 mm. wide. Petals elliptic-oblong, obtuse, 9-10 mm. long and 5-6 mm. wide. Lip entire, suborbicular, slightly convex, 9-10 mm. long and 9-10 mm. wide, the anterior margin sometimes slightly retuse, the disk with an elliptic-oblong to obovate, obtuse callus, about 5 mm. long and 3-4 mm. wide, the apex conspicuously thickened and papillose, with a short, erect, acute, central spur. Column about 2 mm. long, with conspicuous lateral wings, the base without a foot.

Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., *Allen 2160, 3550*.

A strikingly handsome highland species apparently allied to *L. Pittieri*, but distinguished by the broad, obtuse leaves, the larger flowers, and the unique, entire, suborbicular lip.

6. *LOCKHARTIA OERSTEDII* Rchb. f. *Xenia Orch.* 1:100, 105, t. 40. 1855.

Lockhartia verrucosa Rchb. f. in Hamb. Gartenzeit. 15:53. 1859.

Lockhartia lamellosa Rchb. f. loc. cit. 16:300. 1860.

Fernandezia robusta Batem. in Bot. Mag. t. 5592. 1866.

Lockhartia robusta (Batem.) Schltr. in Fedde Rep. Sp. Nov. 3:82. 1906.

Caespitose, epiphytic herbs with strongly flattened, foliaceous stems 7–40 cm. long and 0.8–1.5 cm. wide. Leaves narrowly triangular as seen in profile, acute, 1–3 cm. long and 0.4–0.8 cm. wide. Inflorescences very short, 1- to 3-flowered racemes produced from the axils of the upper leaves. Flowers very variable in size, but often relatively large and attractive, the pedicels subtended by papery, ovate-cordate bracts. Sepals usually strongly reflexed, sometimes slightly concave, yellow, the laterals sometimes spotted with red, elliptic-oblong to ovate, obtuse or shortly acute, 4–8 mm. long and 3–5 mm. wide. Petals yellow, sometimes spotted red, oblong-ovate to broadly and obliquely ligular, obtuse or slightly retuse at the apex, antrorsely incurving in natural position, the lateral margins usually more or less undulate and strongly reflexed, 4–8 mm. long and 3–6 mm. wide. Lip complexly 3-lobed, 7–12 mm. long and 6–14 mm. wide, yellow with red or reddish brown markings at the base, the lateral lobes linear-ligular, obtuse or obliquely acute, spreading or antrorsely incurving in natural position, the mid-lobe more or less pandurate, 4-lobulate, the basal half distinctly narrower than the apical half, the small basal lobules rounded or obliquely triangular, strongly reflexed in natural position, sometimes confluent with the bases of the linear lateral lobes, the center of the mid-lobe with a distinct constriction which is often prolonged into a short isthmus, the apical lobule usually abruptly dilated, 2-parted with a deep central sinus, the disk with a narrowly flabellate or sometimes linear, strongly verrucose callus, extending to the median constriction. Column with spreading, minutely denticulate or crenulate lateral wings.

Mexico, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: Llano del Volcán, southwestern slopes of Chiriquí Volcano, 1500 m., *Allen & Fairchild* 3502; vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen & Fairchild* 3493; valley of the upper Río Chiriquí Viejo, vicinity Monte Lirio, 1300–1900 m., *Seibert* 132, 133, 186; without definite locality, 4000–4500 ft., *Powell* 3344, 3352; vicinity Bajo Mono, headwaters of the Río Caldera, 4500 ft., *Davidson* 584; vicinity Finca Lérida, eastern slopes of Chiriquí Volcano, 1750 m., *Woodson & Schery* 236; forested slopes along Quebrada Velo, 5000 ft., *Allen* 4743; bamboo-oak forest, south of Finca Lérida, eastern slopes of Chiriquí Volcano, 6000–7000 ft., *Allen* 4764; forested hills east of Boquete, 4500–6500 ft., *Allen* 4666.

A common, attractive highland species apparently closely allied to the South American *L. lunifera* (Lindl.) Rchb. f. In Panama, the species is readily separable from its nearest ally, *L. amoena*, by the subpandurate mid-lobe of the lip, which is always broadest at the apex.

7. *LOCKHARTIA* PITTIERI Schltr. in Fedde Rep. Sp. Nov. 12:216. 1913.

Lockhartia variabilis A. & S. in Sched. Orch. 8:81. 1925.

Caespitose, epiphytic herbs with distichous, foliaceous stems up to about 20 cm. tall and 2.5–4.5 cm. wide. Leaves linear-lanceolate to narrowly triangular as seen in profile, obliquely acute to acuminate, 2–3.5 cm. long and 0.4–0.9 cm. wide. Inflorescences very short, apparently solitary, 1-flowered scapes produced from the axils of the upper leaves. Flowers of moderate size for the genus, yellow

with an orange callus at the base. Sepals elliptic-lanceolate, acute, with apiculate tips, 3.9–4.9 mm. long and about 2 mm. wide. Petals somewhat broader than the sepals, elliptic-oblong to suborbicular, obtuse to acute, 4–5 mm. long and 2.4–3.2 mm. wide. Lip oblong-quadrate, 7–8 mm. long and 5–6.4 mm. wide, slightly convex, the apex deeply emarginate, the lateral margins sometimes obscurely lobular, the disk with an elliptic-oblong to ovate-oblong callus, the margins elevated, the apex conspicuously thickened and minutely papillose, with an erect, subacute, central spur, the inner elliptic depression with a low, rounded boss.

British Honduras, Costa Rica, and Panama.

CANAL ZONE: vicinity Bohío, *Pittier* 3401; Fort Sherman and mouth of the Chagres River, *Powell* 372; wooded hills near Frijoles, sea level, *Powell* 355; Cativo-Porto Bello trail, *Powell* 361. DARIÉN: vicinity Marraganti, 10–200 ft., *R. S. Williams* 1008.

DOUBTFUL SPECIES

LOCKHARTIA MIRABILIS Rchb. f. *Xenia* Orch. 1:100, 106, *t.* 40, *figs.* 11–12. 1855.

Apparently described from flowering material only, without vegetative parts. The figures in the '*Xenia* Orchidaceae' might be poor drawings of what we know as *Lockhartia Oerstedii*, seen in natural position, with the lateral lobules of the mid-lobe reflexed. Since both of these concepts seem very close to that of the South American *L. lunifera* Rchb. f., and since *L. mirabilis* is absent from all recent collections in Panama, it would seem best to exclude it, pending the rather remote possibility of direct examination of type material of both this and *L. lunifera*.

LOCKHARTIA ELEGANS Hook. in *Bot. Mag.* *t.* 2715. 1827.

A South American species, apparently having the northern limit of its range in Trinidad. Listed by Schlechter from Panama, but absent from all collections.

LOCKHARTIA OBTUSIFOLIA Regel in *Ann. Sci. Nat.* VI, 2:378. 1856.

A Colombian species, doubtfully listed by Kränzlin from Panama. Absent from all collections.

82. ORNITHOCEPHALUS Hook.

ORNITHOCEPHALUS Hook. *Exot. Fl.* 2: *t.* 127. 1825; Benth. & Hook. *Gen. Pl.* 3:568. 1883.

Small, epiphytic herbs without pseudobulbs, the equitant, fleshy or coriaceous leaves distichously imbricating and forming a broad or narrow fan, the blades articulated below, those at the base of the fan caducous, the persistent sheathing bases sometimes thickened and resembling pseudobulbs. Inflorescences 1 to several slender, erect or pendulous racemes produced from the leaf axils. Sepals subequal, free, spreading, often concave. Petals subequal to the sepals or larger and flabellate. Lip entire or 3-lobed, the sessile base continuous with the base of the column, the lateral lobes (if present) membranaceous or sometimes thickened, the mid-lobe short or more frequently elongate, often inflexed, the disk with a fleshy, bifid, bialate or bicornute callus. Column short, rather stout, without wings or ap-

pendages, the rostellar process very long and attenuate, the base of the column without a foot. Anther terminal, operculate, incumbent, imperfectly 2-celled, produced above the cells into an attenuate appendage resting on the rostellar process, sometimes exceeding it in length, the column and anther resembling the head and beak of a bird (genus unknown!); pollinia 4, waxy.

A small genus of dwarf, pseudobulbless, epiphytic herbs, ranging from Mexico to Brazil. Four species are known from Panama.

- a. Rachis of the inflorescence densely glandular-hispid.
 - b. Lip linear-navicular, incurving, the fleshy basal plate with 2 divergent horns..... 1. *O. BICORNIS*
 - bb. Lip subquadrate-cochleate, without 2 divergent horns at the base..... 2. *O. COCHLEARIFORMIS*
- aa. Rachis of the inflorescence glabrous or minutely puberulent.
 - b. Flowers relatively large. Lip panduriform, broadest at the base, with a distinct fleshy, 2-parted callus..... 4. *O. POWELLII*
 - bb. Flowers small. Lip linear-navicular, incurving, the lateral lobes thickened and erect..... 3. *O. INFLEXUS*

1. *ORNITHOCEPHALUS BICORNIS* Lindl. in Bot. Voy. Sulphur, 172. 1843.

Ornithocephalus xiphochilus Schltr. in Fedde Rep. Sp. Nov. 3:251. 1906.

Zygostates costaricensis Nash, in Bull. Torr. Bot. Club 34:122, t. 8. 1907.

Ornithocephalus lanuginosus Ames, in Proc. Biol. Soc. Wash. 34:152. 1921.

Ornithocephalus diceras Schltr. in Fedde Rep. Sp. Nov. Beih. 17:87. 1922.

Small, epiphytic herbs 3.5–12 cm. tall, the equitant leaves distichously arranged in the form of a broad fan. Leaf blades articulated to the conduplicate, imbricating, persistent bases, coriaceous, lanceolate to gladiate as seen in profile, obliquely acute, 2–9 cm. long and 0.4–1.2 cm. wide. Inflorescences 1–10 slender, many-flowered, axillary racemes about equaling the leaves in length, the rachis densely hispid with spreading glandular hairs. Flowers small, greenish or yellowish, on short hispid pedicels subtended by ovate, acute, membranaceous, ciliate bracts. Sepals suborbicular, concave, about 2 mm. in diameter, the reverse surfaces somewhat hispid, with a central elevated keel, terminating in a short mucro. Petals subequal to the sepals, very shortly clawed at the base, the blades orbicular, concave, about 2 mm. in diameter, the reverse surfaces more or less hispid, with a ciliate central keel, terminating in a short mucro. Lip entire, linear-navicular, acute, strongly incurving, about 4–5 mm. long when spread out, the base with a fleshy, papillose, subquadrate to suborbicular, cushion-like callus, produced at the sides into 2 short, divergent, horn-like appendages each about 1 mm. in length.

Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: drowned forest of the Quebrada Ancha, upper Madden Lake region, 70 m., *Steyermark & Allen s. n.*; vicinity Salamanca Hydrographic Station, Gorge of the Río Pequeni, Madden Lake area, 70–80 m., *Dodge, Steyermark & Allen 16969*. PANAMA: hills east of Panama City, sea level, *Powell 174*; edge of forest along Panama-Pacora road, near Río Tecúmen, *Killip 3314*; without definite locality, *Sinclair s. n.* VERAGUAS: without definite locality, *Hinds s. n.*

Fig. 211. *Ornithocephalus bicornis*

A common, small-flowered lowland species distinguished from *O. cochleariformis* by the elongate, narrowly navicular, incurving lip and from *O. inflexus* by the densely hispid rachis and the divergent horns of the basal callus.

2. *ORNITHOCEPHALUS COCHLEARIFORMIS* C. Schweinf. in Bot. Mus. Leaf. Harv. Univ. 4:124. 1937.

Epiphytic herbs 3.5–12 cm. tall. Leaves as seen in profile narrowly elliptic-oblong to broadly ensiform, acute or obliquely acute, 3–7.5 cm. long and 0.7–1.5 cm. wide, the blades articulated to the oblong, persistent, conduplicate bases. Inflorescences 1–8 slender, arching or pendulous racemes up to about 9 cm. long, the rachis densely glandular-hirsute. Flowers of moderate size for the genus, on slender hirsute pedicels subtended by broadly ovate to suborbicular bracts with glandular-ciliate keels and margins. Sepals suborbicular to obovate, concave,

white, about 3 mm. in diameter, the reverse surfaces and margins densely glandular-hirsute, the lateral sepals slightly oblique, with lacerate keels on the outer surfaces. Petals subequal to sepals, white, broadly obovate, concave, the outer surfaces ciliate, with a conspicuously lacerate central keel. Lip deep green, entire, broadly calceiform, deeply concave, about 4.2 mm. long and 3.2 mm. wide, the truncate or subcordate base adnate to the base of the column, the shortly acute apex strongly inflexed, the disk transversely thickened, minutely papillose, the lateral margins decurrent, with 2 short, lateral, acute swellings, finally truncately converging below at the base of the inner concavity of the lip.

Panama.

COCLÉ: lower valley and marshes along the Río Antón, 600 m., *Hunter & Allen* 383, *Allen* 3920, 4233; rim of El Valle de Antón, 2500 ft., *Purdom* s. n.; hills north of El Valle de Antón, 1000 m., *Allen* 2292.

A common highland species of the region of El Valle de Antón, in Coclé Province. It is distinguished by the densely glandular-hirsute outer surfaces of the sepals and petals, and by the broadly calceiform lip.

3. *ORNITHOCEPHALUS INFLEXUS* Lindl. in *Ann. Nat. Hist.* I, 4:384. 1840.

Ornithocephalus mexicanus A. Rich. & Gal. in *Ann. Sci. Nat.* III, 3:24. 1845.

Ornithocephalus elephas Rchb. f. in *Walp. Ann.* 6:493. 1863.

Ornithocephalus Pottsi S. Wats. in *T. Brigh. Guatem. Append.* 429. 1887.

Ornithocephalus Tonduzii Schltr. in *Beih. Bot. Centralbl.* 36²:420. 1918.

Dwarf, epiphytic herbs, the equitant, imbricating leaves forming a fan as in the genus. Leaves linear-lanceolate to ensiform as seen in profile, acute to acuminate, coriaceous, 4.5–8 cm. long and 0.25–0.5 cm. wide, the blades articulated to the persistent, conduplicate bases. Inflorescences 1 to several slender racemes up to about 8 cm. long, produced from the axils of the leaves, the rachis glabrous or minutely puberulent. Flowers small, on slender pedicels subtended by oblong-lanceolate, acute, minutely ciliate bracts. Sepals suborbicular, concave, about 2 mm. in diameter, the reverse surfaces essentially glabrous, with distinct central keels, terminating in a short mucro. Petals broadly flabellate-cuneate to dolabriform, about 2 mm. long and 3 mm. wide. Lip entire, linear-ligular, acute to acuminate, navicular, usually inflexed, about 5 mm. long and 2 mm. wide, the base thickened into a short bialate or biauriculate callus, the fleshy rounded or subquadrate wings usually erect or with the upper margins converging.

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CHIRIQUÍ: without definite locality, 4000 ft., *Powell* 437.

4. *ORNITHOCEPHALUS POWELLII* Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:88. 1922.

Epiphytic herbs 5–8 cm. tall, the equitant leaves distichously arranged in the form of a broad fan, as in the genus. Leaves subfalcately ligular as seen in profile, obliquely acute, often shortly apiculate, coriaceous, 3.5–6.5 cm. long and 0.6–1.2

cm. wide, the blades articulated with the very short, conduplicate, persistent bases. Inflorescences 1 or 2 slender racemes up to about 9 cm. long, produced from the leaf axils, the rachis laterally compressed, narrowly winged, subglabrous to puberulent. Flowers rather large for the genus, deep green with a white basal callus, the short, angulate pedicels subtended by elliptic-ovate, acute bracts which have a strongly developed keel and minutely ciliate margins, the apices of the bracts shortly mucronate. Sepals spreading or reflexed, ovate to oblong-ovate, concave, about 4 mm. long and 2.5–3 mm. wide, the outer surfaces with a distinct central keel, terminating in a short mucro, the margins of the sepals ciliate or serrulate. Petals much broader than the sepals, obovate-cuneate to obovate-flabellate, about 6 mm. long and 8 mm. wide, the upper rounded margins minutely ciliate to serrulate. Lip panduriform, obscurely 3-lobed, about 1 cm. long and 0.5 cm. wide at the base, the broadly ovate to subcordate basal half adnate to the base of the column, the anterior margins converging in an elongate isthmus, the subflabellate apex rather abruptly dilated and truncate, with serrulate margins, the apical half of the lip usually porrect in natural position, the disk with a prominent fleshy, porrect, divergently 2-lobulate callus.

Panama.

PANAMÁ: foothills east of Panama City, sea level, *Powell 231*; San Juan de Pequeni [now under water in the Madden Lake area], *Powell 3279*.

The largest-flowered species of the genus in our area. The pair of low, divergent, linear calli described by Schlechter is an optical illusion produced in translucent liquid material by the shadows of the margins of the lateral sepals which rest against the back of the lip.

82-A. OAKES-AMESIA C. Schweinf. & P. H. Allen

OAKES-AMESIA C. Schweinf. & P. H. Allen in *Bot. Mus. Leaflet Harv. Univ.* 13:133, *t. 10*. 1948.

Dwarf, epiphytic herbs without pseudobulbs, the equitant, coriaceous leaves distichously imbricating and forming a broadly radiate cluster. Leaf blades ensiform as seen in profile, obliquely acute, articulated to the conduplicate bases. Inflorescences erect or arching racemes produced from the subterminal leaf axils. Flowers small, the short pedicels subtended by elliptic-ovate, acuminate bracts. Sepals free, subequal, spreading, or the laterals reflexed, elliptic-oblong, subacute, the reverse surfaces with a distinct central keel. Petals much larger than the sepals, spreading, broadly obovate-flabellate. Lip somewhat fleshy, sharply 3-lobed, exceeding the lateral sepals in length, the base sessile and continuous with the base of the column, the lateral lobes very prominently developed, erect in natural position, the mid-lobe more or less subquadrate when seen from above, somewhat dilated and obscurely biauriculate at the abruptly truncate apex, the small lateral auricles obliquely acute, the under-surface of the mid-lobe produced into a very prominent, obliquely triangular, obtuse to subacute, laterally compressed keel

which is apparently hollow with a narrow transverse opening at the apex of the lip, the disk with a low, linear-ligular, truncate, densely papillose callus. Column very slender and subterete below, somewhat dilated above, wingless and footless, a little below the lightly arcuate apex with a very large, distinctly 3-lobulate rostellar process. Anther suborbicular, terminal, operculate, incumbent, imperfectly 2-celled; pollinia 4, apparently cartilaginous.

A genus of dwarf highland epiphytes thus far known only from Panama. The plants strongly resemble those of the allied genus *Ornithocephalus*, but the flowers are amply separated by the very large, 3-lobulate rostellar process, the relatively very short terminal appendage of the anther, the short, abruptly truncate, sharply 3-lobed lip, the prominent, apparently hollow keel of the lip, the linear-ligular callus, and other characters.

1. OAKES-AMESIA CRYPTANTHA C. Schweinf. & P. H. Allen in Bot. Mus. Leaflet. Harv. Univ. 13:134, f. 10. 1948.

Dwarf, epiphytic herbs, the leaves forming a broadly radiate cluster 4 cm. tall and 7.5 cm. wide. Leaf blades ensiform as seen in profile, obliquely acute, 1.8–3.9 cm. long and 0.3–0.5 cm. wide, articulated to the conduplicate bases, the plants identical in vegetative appearance with those of *Ornithocephalus inflexus*. Inflorescences 1 to 3 erect or arching racemes about 5.5 cm. long, produced from the subterminal leaf axils, the rachis slightly fractiflex and rather complanate, narrowly triangular in cross-section. Flowers small, the sepals and petals white, the lip dark green marked with white, the short pedicels subtended by long, elliptic-ovate, acuminate bracts which have strongly developed keels on the lower surfaces, the bracts conspicuously exceeding the floral pedicels in length. Sepals free, subequal, elliptic-oblong, subacute, slightly concave, unevenly serrulate, irregularly glandular-verrucose on both surfaces, the reverse surfaces with a distinct central keel, terminating in an elongate spinous process, the dorsal sepal spreading or slightly reflexed, about 2.7 mm. long and 1.25 mm. wide, the lateral sepals strongly reflexed, about 2.9 mm. long and 1.5 mm. wide. Petals much larger than the sepals, spreading, broadly obovate-flabellate, the abruptly truncate blades with shallow transverse concavities below the irregularly serrulate upper margins, the blades about 3 mm. long and 3 mm. wide at the apex, both the frontal and reverse surfaces irregularly glandular-verrucose. Lip rather fleshy, sharply 3-lobed, the sessile base continuous with the base of the column, the very prominent lateral lobes rather obliquely oblong, truncate, erect in natural position and somewhat antrorse, about 1.5 mm. long and 1 mm. wide, minutely ciliate, the mid-lobe subquadrate when seen from above, somewhat dilated and obscurely biauriculate at the abruptly truncate apex, the small lateral auricles obliquely acute, the under-surface of the mid-lobe produced into a very prominent, obliquely triangular, obtuse to subacute, laterally compressed keel which is apparently hollow with a narrow, transverse opening at the apex of the lip, the entire lip sparsely and irregularly glandular-verrucose, about 4 mm. long and 2.5 mm. wide at the apex,

the disk with a low, linear-ligular, abruptly truncate, densely papillose callus. Column very slender below, wingless, footless, below the slightly arcuate apex extends a very large, 3-lobulate rostellar process which considerably exceeds the rest of the column in length and bulk, 3 mm. long and 1 mm. wide, the lateral lobules semiorbicular, abruptly deflexed in natural position, the porrect, slightly undulate apical lobule more or less terete, all 3 lobules of the rostellar process rather densely glandular-verrucose. Column above the rostellar process short, slightly arcuate, the anther suborbicular, terminal, operculate, incumbent, imperfectly 2-celled, with a slender, ligular, acuminate appendage, the rostellar process and anther rather resembling the head and folded legs of a praying mantis when seen in profile.

Panama.

COCLÉ: Cerro Pajita, hills north of El Valle de Antón, 1000-1200 m., Allen & Allen 4196.

83. NOTYLIA Lindl.

NOTYLIA Lindl. in Bot. Reg. 11: sub t. 930. 1825; Rchb. f. Xenia Orch. 1:49. 1854; Benth. & Hook. Gen. Pl. 3:586. 1883.

Tridachne Liebm. ex Lindl. in Paxt. Flow. Gard. 3:45. 1852-53, nom nud.
Macroclinium Barb. Rodr. Gen. & Spec. Orch. Nov. 2:236. 1882.

Small, epiphytic herbs with or without pseudobulbs. Leaves usually flat, rarely equitant, coriaceous or fleshy. Inflorescences arching or pendulous, few- to many-flowered racemes, or rarely panicles, produced from the bases of the pseudobulbs or axils of the leaves. Flowers usually small, rarely of moderate size, on slender pedicels, the subtending bracts usually narrow. Sepals subequal, usually narrow, erect or spreading, free or with the laterals more or less connate. Petals subequal to the sepals or smaller. Lip entire or obscurely lobed, usually clawed at the base, rarely sessile, continuous with the base of the column, the lamina triangular or hastate, acuminate, the disk smooth or with a carinate callus. Column erect, terete or sulcate, glabrous, papillose or velutinous, without wings or appendages, the apex usually slightly recurved, the rostellum more or less elongate, acuminate, erect, the base of the column without a foot. Anther erect, oblong, imperfectly 2-celled, above the cells more or less long-appendaged and applied to the rostellum; pollinia 2, waxy.

Small tropical American herbs ranging from Mexico to Brazil. They have been divided by Cogniaux into two well-marked subgenera, in the first of which, *EUNOTYLIA*, the plants have small but distinct, monophyllous pseudobulbs, with flat leaves; while in the second, *MACROCLINIUM*, the leaves are equitant and distichously imbricating, the conduplicate bases sometimes enveloping a small complanate pseudobulb. Five species, representing both subgenera, are known from Panama.

- a. Leaves equitant, ensiform. Lip cordate-hastate, distinctly 3-lobed.
(Subgenus *MACROCLINIUM*)..... 2. *N. CORDESI*
- aa. Leaves flat, ligular to oblong-lanceolate. Lip trulliform. (Subgenus
EUNOTYLIA).
b. Column distinctly papillose..... 5. *N. PENTACHNE*
bb. Column glabrous.
c. Lip about 5 mm. wide at the base..... 3. *N. LATILABIA*
cc. Lip less than 3 mm. wide at the base.
d. Dorsal sepal broadly elliptic-oblancoate, obtuse, about 5 mm.
wide, distinctly broader than the lip..... 4. *N. PANAMENSIS*
dd. Dorsal sepal linear-lanceolate, subacute, 2 mm. wide or less, dis-
tinctly narrower than the lip..... 1. *N. BARKERI*

1. *NOTYLIA BARKERI* Lindl. in Bot. Reg. n. s. 1: Misc. 90. 1838.

Notylia multiflora Hook. in Lond. Jour. Bot. 3:315, t. 10. 1844, non Lindl.

Notylia Huegelii Fenzl. in Denkschr. Akad. Wien, Math. Nat. Kl. 2:255. 1850.

Notylia trisepala Lindl. & Paxt., in Paxton's Flow. Gard. 3:45. 1852-53; Bot. Mag. t. 8306. 1910.

Tridachne virens Liebm. ex Lindl. & Paxt. loc. cit. 1852-53.

Notylia Tridachne Lindl. & Paxt. loc. cit. 1852-53.

Notylia bipartita Rchb. f. Xenia Orch. 1:47. 1854.

Notylia tamaulipensis Rchb. f. in Hamb. Gartenzeit. 16:281. 1860.

Notylia guatemalensis S. Wats. in Proc. Amer. Acad. 22:477. 1887, non Schltr.

Notylia angustilancea Schltr. in Orchis 8:135, t. 4, figs. 8-13. 1914.

Notylia guatemalensis Schltr. in Fedde Rep. Sp. Nov. 15:208. 1918, non S. Wats.

Notylia Bernoullii Schltr. in Beih. Bot. Centralbl. 36²:502. 1918, nomen.

Notylia Pittieri Schltr. loc. cit. 418. 1918.

Notylia turialbae Schltr. in Fedde Rep. Sp. Nov. Beih. 19:145. 1923.

Notylia Brenesii Schltr. loc. cit. 249. 1923.

Small, epiphytic herbs with oblong, compressed, monophyllous pseudobulbs up to about 2.5 cm. long and 1.0 cm. wide, the bases enveloped in several imbricating bracts, the uppermost 1 or 2 of which are conspicuously foliaceous. Leaves and bract blades ligular, obtuse to subacute, coriaceous, up to about 18 cm. long and 0.8-4 cm. wide. Inflorescences 1 or 2 arching or pendulous, densely flowered racemes up to about 30 cm. long but often considerably less, produced from the bases of the pseudobulbs. Flowers small, white, sometimes spotted yellow, on filiform pedicels, subtended by narrow, acuminate bracts. Sepals subequal, more or less spreading, the dorsal sepal free, linear-lanceolate, subacute, concave, somewhat inflexed, 3-6 mm. long and 1-2 mm. wide, the lateral sepals usually more or less connate, rarely free, forming a single bifid segment under the lip, 3-5 mm. long and 1-2 mm. wide, rather obliquely subacute. Petals subfalcately linear-lanceolate, acute, 2.5-5 mm. long and 1-1.5 mm. wide. Lip clawed at the base and continuous with the base of the column, the lamina narrowly triangular, acuminate, 3-5 mm. long and 1-2 mm. wide at the base, the disk usually with a distinct carinate callus. Column slender, erect, terete, 2-3 mm. long, the base without a foot.

Mexico to Panama.

CANAL ZONE: near Balboa, sea level, Powell 405. VERAGUAS: Santa Fé, 2500 ft., Powell 401. CHIRIQUÍ: without definite locality, 4000 ft., Powell 427.

The plants and flowers are quite variable in size and in the degree to which the lateral sepals are connate, but the floral structure otherwise is rather remarkably uniform, particularly in view of the great geographic range. It is difficult to believe that any great weight should be attached to the degree of connation of the lateral sepals since they are found to be very easily separable, both in specimens in liquid and in flowers boiled out for examination, so that one specific concept can be transformed into another simply by a little carelessness with the dissecting instruments!

2. *NOTYLIA CORDESII* L. Wms. in Ann. Mo. Bot. Gard. 26:286, t. 21, figs. 3-4. 1939.

Dwarf, epiphytic herbs with equitant, distichously imbricating leaves, the conduplicate bases enveloping a small, oblong-complanate, monophyllous pseudobulb 1-1.5 cm. long and about 0.5 cm. wide, the plants reminiscent of those of an *Ornithocephalus*. Leaves lanceolate to linear-lanceolate as seen in profile, ensiform, rather obliquely acuminate, the blades articulated to the conduplicate bases, 4-6 cm. long and 0.3-0.5 cm. wide. Inflorescences slender, essentially simple, subumbellate racemes, 4-6 cm. long, with 1 or 2 slender, simple, secondary inflorescences usually being produced from the nodes of the primary scape. Flowers of moderate size for the genus, on spreading, filiform pedicels subtended by lanceolate, acute or acuminate, papery bracts. Sepals free, subequal, the dorsal sepal linear-lanceolate, acuminate, about 10 mm. long and 1.5 mm. wide, the lateral sepals rather obliquely linear-lanceolate, acuminate, about 12-13 mm. long and 0.6-1 mm. wide. Petals obliquely lanceolate, acuminate, about 10 mm. long and 1.2 mm. wide. Lip with an elongate basal claw, about 4 mm. long, the middle with a biauriculate thickening, the anterior margin of which is papillose-pubescent, the blade of the lip abruptly dilated, cordate-hastate, acuminate, about 4 mm. long and 2 mm. wide, the retrorse lateral lobes distinctly serrulate. Column slender, terete, about 3 mm. long, typical of the genus.

Panama and Costa Rica.

BOCAS DEL TORO: Mosquito Hill, Woodson, Allen & Seibert 1932.

Apparently closely allied to *Notylia Wulfschlaegeliana* Focke. Known only from the type collection and a single subsequent collection from the Dulce Golfo region in Costa Rica.

3. *NOTYLIA LATILABIA* A. & S. in Sched. Orch. 8:71. 1925.

Epiphytic herbs unusually large for the genus, up to about 25 cm. tall, with short, oblong-complanate, striate-rugose, monophyllous pseudobulbs up to about 1.5 cm. long and 0.8 cm. wide, completely concealed by the large ovate-lanceolate, papery bracts which become fibrous with age. Leaves oblong-lanceolate to elliptic-lanceolate, subacute, coriaceous, up to about 20 cm. long and 4-5 cm. wide, contracted below into short, conduplicate petioles. Inflorescences 1 or 2 arching or pendulous, densely flowered racemes 13-21 cm. long, produced from

the base of the current pseudobulb. Flowers relatively large for the genus, on slender pedicels subtended by narrowly triangular, acuminate bracts. Sepals concave, orange, the dorsal sepal free, fornicatè, oblong-lanceolate, acute when flattened out, about 9–10 mm. long and 2.3–3 mm. wide, the lateral sepals connate to nearly the apex, forming a single bifid segment below the lip, about 8–9 mm. long and 4 mm. wide when spread out, the apices strongly reflexed. Petals falcately linear-ligular, acute, entirely white, antrorsely incurving in natural position, the apices deflexed, 7.6–8.4 mm. long and about 1.6 mm. wide. Lip shortly clawed at the base and obliquely inserted on the base of the column, the blade broadly trulliform, 6.3–7.1 mm. long (including the claw) and 4–5 mm. wide, the abruptly acuminate apex strongly recurved in natural position, the disk with a low carinate callus. Column slender, terete, glabrous, about 4.9 mm. long, typical of the genus.

Panama.

CANAL ZONE: Frijoles, sea level, Powell 406.

Reminiscent of *Notylia Barkeri*, but differing in the larger vegetative habit and much broader lip.

4. *NOTYLIA PANAMENSIS* Ames, *Orchidaceae* 7:112. 1922.

Epiphytic herbs rather large for the genus, up to about 18 cm. tall, with oblong, compressed, monophyllous pseudobulbs about 2 cm. long and 1 cm. wide, partially enveloped in the papery imbricating bracts which apparently soon weather away. Leaves oblong-lanceolate, obtuse and unequally bilobulate, coriaceous, up to 15 cm. long and 3–3.5 cm. wide, contracted below into very short, conduplicate petioles. Inflorescences pendulous, densely flowered racemes up to about 20 cm. long, produced from the base of the current pseudobulb. Flowers relatively large for the genus, white, on slender pedicels subtended by scarious, narrowly triangular, acuminate bracts. Sepals spreading, the dorsal sepal broadly elliptic-oblancoate, obtuse, concave, about 7 mm. long and 5 mm. wide, the lateral sepals connate to the apex, forming a single linear-lanceolate segment below the lip, about 8 mm. long and about 2 mm. wide. Petals elliptic-lanceolate, acute, about 7 mm. long and up to 2.5 mm. wide. Lip clawed at the base, obliquely inserted on the base of the column, the blade sagittate, about 6 mm. long (including the claw) and 3 mm. wide across the base, the disk with a short, carinate callus. Column slender, terete, glabrous, about 3 mm. long.

Panama.

DARIÉN: Marragantí and vicinity, 10–200 ft., R. S. Williams 977.

A very distinctive species by reason of the broadly elliptic-obovate, obtuse dorsal sepal. Known only from the type collection.

5. *NOTYLIA PENTACHNE* Rchb. f. in *Bonplandia* 2:90. 1854.

Notylia gracilisipica Schltr. in *Fedde Rep. Sp. Nov. Beih.* 17:75. 1922.

Epiphytic herbs of variable size, up to about 25 cm. tall, with oblong, compressed, monophyllous pseudobulbs up to about 2.5 cm. long and 1.2 cm. wide, usually partially enveloped in the conduplicate bases of the foliaceous bracts. Leaves and bract blades oblong-lanceolate to ligular, obtuse to subacute, coriaceous, up to about 20 cm. long and 2-5 cm. wide, contracted below into short conduplicate petioles. Inflorescences 1 or 2, usually elongate, slender, pendulous, many-flowered racemes up to about 35 cm. long, produced from the base of the current pseudobulb. Flowers of moderate size for the genus, on filiform pedicels subtended by inconspicuous linear-lanceolate, acuminate bracts. Sepals pale green, concave, the dorsal sepal lanceolate, acuminate, 8-10 mm. long and about 2-2.5 mm. wide, the apex slightly recurved, the lateral sepals connate for more than half their length, forming a single bifid segment below the lip, about 10 mm. long and 2.5 mm. wide, the subfalcate, acuminate apices divergently spreading and retrorse in natural position. Petals about 8 mm. long and 1.5 mm. wide, rather obliquely lanceolate, shortly acuminate, white with 2 minute orange spots in the center. Lip with an elongate, slender basal claw, the blade abruptly dilated and trulliform, acuminate, white, about 6 mm. long (with the claw) and up to about 2 mm. wide at the base, the disk with a short, carinate callus. Column slender, terete, distinctly papillose, about 5 mm. long.

Panama.

CANAL ZONE: along Río Chagres between Gamboa and Alajuela, 30-60 m., *Allen* 961; vicinity Gamboa, *Allen* 3926, *Pittier* 2610; Las Cruces, *Powell* 3130, Frijoles, *Powell* 3318; hills east of Panama City, *Powell* 185, 3230. VERAGUAS: Santa Fé, about 2500 ft., *Powell* 400.

A common lowland species, closely allied to the widespread *N. Barkeri*, but differing in the papillose column.

84. MACRADENIA R. Br.

MACRADENIA R. Br. in Bot. Reg. 8: t. 612. 1822; Benth. & Hook. Gen. Pl. 3:586. 1883.

Rhynchadenia A. Rich. in Sagra, Hist. Fis., Pol. y Nat. Cuba 12 (Fl. Cub. Fanerog. 2):248, t. 85. 1853.

Serrastylis Rolfe, in Gard. Chron. 16:726. 1894.

Small, epiphytic, pseudobulbose herbs, the plants reminiscent of a *Notylia* in habit. Leaves flat, ligular to lanceolate, fleshy or coriaceous. Inflorescences nodding or pendulous racemes, produced from the base of the current pseudobulb. Flowers of moderate size or sometimes rather small, on slender pedicels subtended by small bracts. Sepals subequal, free, more or less spreading. Petals similar to the sepals or a little smaller. Lip continuous with the base of the column, erect, deeply 3-lobed, the lateral lobes rather broad, erect, embracing the column, the mid-lobe spreading. Column erect, subterete, wingless, footless, the apex sulcate, the rostellum slender, erect or slightly inclined, the clinandrium broadly cupulate, with fimbriate or dentate margins. Anther erect at the base of

the clinandrium, oblong, imperfectly 2-celled, produced into a long appendage embracing the rostellum; pollinia 2, waxy.

A small genus of tropical American epiphytes, ranging from Florida and the West Indies to Mexico, Peru, and Brazil. One species is known from Panama.

1. *MACRADENIA BRASAVOLAE* Rchb. f. in Bot. Zeit. 10:734. 1852.

Epiphytic herbs with narrowly linear to oblong, compressed, monophyllous pseudobulbs 2.5–4.5 cm. long and 0.4–1.0 cm. wide, enveloped below in a few imbricating, papery bracts which soon weather away. Leaves ligular, acute, coriaceous, 6.5–16 cm. long and 1.2–2.2 cm. wide, contracted below into short, slender, conduplicate petioles. Inflorescences usually solitary, arching or pendulous, many-flowered racemes up to about 25 cm. long, but often less. Flowers of moderate size, on slender pedicels, subtended by inconspicuous, linear-lanceolate, acuminate bracts. Sepals subequal, free, spreading, reddish brown with translucent green margins, the dorsal sepal lanceolate, acuminate, concave, about 18 mm. long and 5 mm. wide, the laterals linear-lanceolate, acuminate, about 20 mm. long and 4 mm. wide, the reverse surfaces with a low central keel. Petals narrower than the sepals, reddish brown with translucent green margins, linear-lanceolate, acuminate, about 16 mm. long and 3.5 mm. wide. Lip conspicuously 3-lobed, about 12–15 mm. long and 7 mm. wide when spread out, contracted at the base and continuous with the base of the column, the lateral lobes semi-orbicular, white, erect, and embracing the column in natural position, the obliquely subacute anterior margins reflexed, the mid-lobe reddish brown, narrowly linear, acuminate, about 9 mm. long and 1 mm. wide, the disk with a low, fleshy, linear-oblong, obscurely striate callus. Column 6–7 mm. long, subterete, narrowed below, gradually dilated above, the margins of the clinandrium conspicuously lacerate, the rostellum narrowly linear-acuminate.

Guatemala, Nicaragua, Panama, Colombia, and probably adjacent territories.

PANAMÁ: hills east of Panama City, vicinity Juan Díaz, *Powell* 3491, 3501; without definite locality, *Fairchild* s. n.; vicinity Pacora, *Allen* 2357.

85. *TELIPOGON* HBK.

TELIPOGON HBK. Nov. Gen. & Spec. 1:335, t. 75. 1815; Benth. & Hook. Gen. Pl. 3:587. 1883; Kränzl. in Ann. Nat. Hist. Hofmus. Wien 33:9. 1919.

Telopogon Mutis, ex Spreng. Anleit. 2¹:291. 1817.

Thelypogon Spreng. Syst. Veg. 3:742. 1826.

Epiphytic herbs without pseudobulbs, the foliaceous stems short or elongate. Leaves usually narrow, distichous, congested or relatively distant, the blades articulated to the conduplicate bases, often deciduous, pergameneous, coriaceous or fleshy. Inflorescences slender, erect, few-flowered, pseudoterminal racemes produced from the uppermost leaf axils and usually exceeding the leaves in length. Flowers usually large in relation to the size of the plant, rarely small, on slender

pedicels subtended by small, inconspicuous bracts. Sepals subequal, free, broadly spreading, narrow, usually almost completely hidden by the petals and lip. Petals very broad, spreading, much exceeding the sepals in width, distinctly veined. Lip sessile at the base, broadly spreading, usually undivided, similar to the petals or a little broader, rarely smaller, prominently radiate or reticulate-veined. Column very short, stout, wingless, footless, densely setose or hispid on all sides or sometimes only at the apex, the rostellum terminal, erect, usually prominent. Anther erect, applied to the rostellum, distinctly 2-celled; pollinia 4, waxy.

Perhaps 60 species of small, tropical highland epiphytes, ranging from Costa Rica to Brazil and Peru. Two species are known from Panama.

- | | |
|---|--------------------------|
| a. Lip more than 2 cm. wide, radiate-veined, without secondary transverse nerves..... | 2. <i>T. RADIATUS</i> |
| aa. Lip less than 2 cm. wide, reticulate-veined, with distinct secondary transverse nerves..... | 1. <i>T. DENDRITICUS</i> |

1. *TELIPOGON DENDRITICUS* Rchb. f. *Otia* Bot. Hamb. 1:6. 1878.

Dwarf, epiphytic herbs with short foliaceous stems 3 cm. tall (in our specimen). Leaves linear-lanceolate, acute, subcoriaceous, the blades 1.5–2 cm. long and 0.25–0.3 cm. wide, contracted below into a short, sheathing petiole. Inflorescences 1- to 2-flowered scapes up to about 6 cm. long, produced from the subterminal leaf axils. Flowers in our specimen about 2.5 cm. in diameter, pale greenish yellow, veined brown. Sepals narrowly triangular, acuminate, apparently 3-nerved, about 1 cm. long and 0.3 cm. wide. Petals incomplete in our specimen, apparently broadly rhombic, 9-nerved, probably about 1.2 cm. long and 1.2 cm. wide. Lip similar to the petals, transversely rhombic-ovate, obtuse, minutely apiculate, about 1.5 cm. long and 1.9 cm. wide, distinctly reticulate-veined, apparently with 19 primary veins and many secondary transverse nervules, the disk minutely puberulent. Column densely setose, the slender rostellum prominently projecting, as in the genus.

Panama and Colombia.

CHIRIQUÍ: vicinity Bajo Chorro, headwaters of the Río Caldera, 1900 m., Woodson & Schery 694.

The vegetative portion of our single specimen is very small, but the flower, although lacking the apices of the petals, seems to compare very well with the type description. The species apparently is allied to *Teliogon parvulus* of Costa Rica, but differs in the larger flowers and the distinct reticulate venation of the lip.

2. *TELIPOGON RADIATUS* Rchb. f. in *Linnaea* 41:70. 1877.

Dwarf, caespitose, epiphytic herbs, the distichous, congested, foliaceous stems 3.5–8 cm. tall. Leaves elliptic-lanceolate to ligular, acute, subcoriaceous, the blades 2–5.5 cm. long and 0.5–1 cm. wide, contracted below into short, conduplicate, imbricating petioles. Inflorescences 1 or 2 slender, erect, few-flowered racemes up to about 9 cm. long, produced from the subterminal leaf axils. Flowers averaging about 3.5 cm. in diameter, golden yellow striped with rich brown,

the elongate, slender pedicels subtended by very short, inconspicuous, narrowly triangular bracts. Sepals narrowly triangular, acuminate, 3-nerved, 1.2–1.5 cm. long and 0.35–0.4 cm. wide, the central nerves thickened and carinate on the outer surfaces. Petals broadly rhombic-ovate, shortly and distinctly acute, much exceeding the sepals in width, 9- to 11-nerved, 2–2.5 cm. long and 1.8–2.1 cm. wide. Lip subequal to the petals, the sessile base adnate to the base of the column, the blade transversely rhombic-ovate, obtuse, minutely apiculate, 19- to 21-nerved, the nerves radiate without secondary transverse nervules, about 2 cm. long and 2.2–2.7 cm. wide, the disk with a short, rounded, densely pilose callus. Column about 5 mm. long, densely setose, the slender rostellum prominently projecting.

Panama, Colombia, and Peru.

CHIRIQUI: vicinity Casita Alta, Finca Lérida, eastern slopes of Chiriquí Volcano, 1500–2000 m., Woodson, Allen & Seibert 961.

Our specimens differ from the combined concepts of Reichenbach f. and Kränzlin in the slightly smaller, apiculate lip, but otherwise appear to be identical. Evidently closely allied to *Telipogon ampliflorus* C. Schweinf. of Costa Rica, but differing in the radiate, rather than reticulate, venation of the lip and in the much more densely setose column.

86. DICHAEA Lindl.

DICHAEA Lindl. Gen. & Spec. Orch. Pl. 208. 1833; Benth. & Hook. Gen. Pl. 3:556. 1883; Kränzlin in Engler, Pflanzenr. IV, Fam. 50 (Heft 83):33 1923.

Fernandezia R. & P. Fl. Peru & Chil. Prodr. 123. 1794 (in part).

Epithecia Knowl. & Westc. Fl. Cab. 2:167, t. 87. 1838.

Epithecium Benth. & Hook. Gen. Pl. 3:529, 1239. 1883, sphalm.

Dichaeopsis Pfitz. in Engler & Prantl, Pflanzenfam. 2⁶:207. 1888.

Epiphytic herbs without pseudobulbs, the erect or pendulous, monopodial, foliaceous stems enveloped in the conduplicate, distichously imbricating leaf bases. Leaf blades short to elongate, pergameneous to coriaceous, articulated and ultimately deciduous, or connate with the sheathing bases and persistent. Inflorescences 1 to several short, 1-flowered scapes produced from the axils of the leaves. Flowers relatively small. Sepals subequal, free, spreading, the laterals rather obliquely inserted, the bases sometimes forming a mentum with the column foot. Petals subequal to the sepals or narrower. Lip affixed to the base of the column, usually clawed, rarely sessile, the blade usually 3-lobed, often more or less anchoraeform when spread out, infrequently entire, the lateral lobes (if present) triangular to linear, short or elongate, usually retrorse in natural position, sometimes reduced to acute angular projections at the base of the blade, the disk usually without a callus. Column short, erect, wingless or rarely narrowly winged, the margins of the clinandrium often denticulate, the under-surface of the column sometimes with a glabrous or pubescent infra-stigmatic ligule, the base of the column produced into a short foot. Capsule ovoid or oblong, muricate, setose or smooth.

A difficult genus of tropical American epiphytes, ranging from Mexico and the West Indies to Brazil and Peru. Five species are known to occur in Panama.

- a. Leaf blades not articulated, not deciduous.
 - b. Leaf margins densely ciliate..... 1. *D. CILIOLATA*
 - bb. Leaf margins not ciliate..... 3. *D. MURICATA*
- aa. Leaf blades articulated to the sheathing bases, deciduous.
 - b. Leaves broadly oblong-ligular, obtuse, minutely apiculate, 8 mm. wide or more..... 2. *D. MORRISII*
 - bb. Leaves narrowly linear-lanceolate, acute or acuminate, 6 mm. wide or less.
 - c. Leaves 4 cm. long or less, usually of alternating groups of unequal length..... 4. *D. PANAMENSIS*
 - cc. Leaves more than 6 cm. long, all of about equal length..... 5. *D. POWELLII*

1. *DICHAEA CILIOLATA* Rolfe, in Kew Bull. 83. 1917.

Small, epiphytic herbs, the distichous, often branching, densely foliaceous stems up to about 15 cm. tall and 8–10 mm. wide. Leaf blades elliptic-oblong, acute, distinctly keeled below, the margins densely ciliate, 2.5–3 mm. long and 2.5–3 mm. wide at the base, the blades not articulated to the sheathing bases, not deciduous. Inflorescences slender, 1-flowered scapes 4–6 mm. long, produced from the upper leaf axils, the apex with 2 short, spathaceous bracts enveloping the ovary. Flowers small, the sepals and petals pale buff with red-purple spots and bars, the lip white marked with purple. Sepals free, the dorsal sepal oblong, acute, 5.5–7 mm. long and about 2 mm. wide, the lateral sepals ovate, acute to shortly acuminate, rather concave at the base, 6–8 mm. long and 2–3 mm. wide, the outer surfaces of the sepals sparsely verrucose. Petals rather obliquely elliptic-lanceolate, acute, about 7 mm. long and 3 mm. wide. Lip shortly clawed at the base, the claw more or less geniculate in profile and continuous with the base of the column, the blade anchoraeform when spread out, 3-lobed, the narrowly linear, subfalcate, lateral lobes retrorsely incurving, the mid-lobe triangular, broadly acute, the lateral margins more or less erect in natural position, the entire lip (including the claw) about 4.5–6.4 mm. long and 6–8 mm. wide. Column rather stout, wingless, 3–5 mm. long, the lower surface with a short infra-stigmatic ligule. Capsule densely muricate.

Costa Rica and Panama.

CHIRIQUÍ: without definite locality, 4000 ft., Powell 435.

This concept is very closely allied to that of *Dichaea hystricina* Rchb. f. and may ultimately prove to be conspecific.

2. *DICHAEA MORRISII* Fawcett & Rendle, in Jour. Bot. 48:107. 1910.

Epithecia Morrisii Schltr. in Orchis 9:26. 1915.

Dichaea Bradeorum Schltr. in Fedde Rep. Sp. Nov. Beih. 19:154. 1923.

Epiphytic herbs, the erect or pendulous stems up to about 40 cm. tall, enveloped in the very broad, conduplicate bases of the distichously imbricating leaves, the plants superficially resembling some of the pseudobulbless *Maxillarias*. Leaf blades articulated to the sheathing bases and ultimately deciduous below,

elliptic-oblong to broadly ligular, obtuse and minutely apiculate, subcoriaceous, 3-7 cm. long and 0.8-1.5 cm. wide. Inflorescences 1-flowered scapes, about 8 mm. long, produced from the upper leaf axils, the peduncle provided at the apex with 2 large spathaceous bracts which completely envelop and conspicuously exceed the ovary. Flowers large for the genus, the sepals and petals pale green striped deep lavender, the lip deep lavender. Sepals lanceolate, acuminate, slightly concave, the margins minutely ciliate, about 11-15 mm. long and 5-7 mm. wide, the lateral sepals rather oblique and a little broader than the dorsal sepal, with a rather indistinct central keel on the outer surface. Petals subequal to the dorsal sepal, lanceolate, acuminate, slightly concave, about 10-12 mm. long and 3.5-4 mm. wide, the margins minutely ciliate. Lip fleshy, the linear-oblong, slightly arcuate claw narrowed at the base and affixed to the very short column foot, the blade dilated and 3-lobed, more or less anchoraeform, the lateral lobes short to elongate, ligular to subular, sometimes falcately triangular-linear, usually more or less retrorse in natural position, the mid-lobe rather narrowly triangular, usually reflexed, acute or shortly acuminate, minutely papillose on both surfaces, the entire lip (including the claw) about 9-10 mm. long and 5-6 mm. wide. Column very stout, the lateral margins narrowly winged, 4-6 mm. long, the clinandrium very broad, with serrulate margins, the under-surface of the column with a subquadrate, puberulent, slightly emarginate, infra-stigmatic ligule, the base of the column produced into a very short foot. Capsule densely setose.

Jamaica, Santo Domingo, Costa Rica, and Panama.

COCLÉ: hills north of El Valle de Antón, 1000 m., Allen 2874. CHERIQUÍ: vicinity Bajo Chorro, 6000 ft., Davidson 221.

Apparently a very variable species. The collection cited above from El Valle de Antón is rather atypical in the narrower leaves and the much reduced lateral lobes of the lip.

3. *DICHAEA MURICATA* (Sw.) Lindl. Gen. & Sp. Orch. Pl. 209. 1833.

Cymbidium muricatum Sw. in Nov. Act. Soc. Upsal. 6:71. 1799.

Dichaea latifolia Lindl. Gen. & Sp. Orch. Pl. 208. 1833.

Dichaea Moritzii Rchb. f. in Nederl. Kruidk. Arch. 4:328. 1858.

Dichaea muricata Lindl. β *latifolia* Lindl. ex Griseb. Fl. Brit. W. Ind. 624. 1864.

Dichaea muricata Lindl. var. *Moritzii* Cogn. in Mart. Fl. Bras. 3^o:488. 1906.

Dichaea ovatifolia Schltr. in Fedde Rep. Sp. Nov. Beih. 19:266. 1923.

Dichaea similis Schltr. loc. cit. 307. 1923.

Dichaea verrucosa Ames & Schweinf. in Sched. Orch. 8:83. 1925.

Epiphytic herbs with elongate, pendulous, monopodial, foliaceous stems, up to about 60 cm. long, completely enveloped in the persistent, distichous leaves. Leaf blades elliptic-oblong to ligular, obtuse to acute, with entire margins, the under-surface distinctly keeled, terminating at the apex in a minute to relatively elongate apicule, the blades often rather obliquely spreading, not articulated to the sheathing bases, not deciduous, 10-20 mm. long and 4-7 mm. wide. Peduncles slender, 1-flowered, 1-2 cm. long, produced from the upper leaf axils. Flowers of moderate size for the genus. Sepals elliptic-lanceolate,

shortly acuminate, about 7.5 mm. long, 2.5 mm. wide, the outer surfaces usually more or less verrucose. Petals subequal to the sepals, elliptic-lanceolate, acute to shortly acuminate, about 7 mm. long and 2 mm. wide. Lip anchoraeform in outline when spread out, the broad claw contracted at the base and affixed to the base of the column, the blade abruptly dilated and distinctly 3-lobed, the short, acute or acuminate lateral lobes more or less falcately retrorse in natural position, the mid-lobe shortly triangular, acute or apiculate, the entire lip, including the claw, about 6 mm. long and 3.2 mm. wide. Column stout, about 2.5–3 mm. long, the under-surface with a small infra-stigmatic ligule, the broad clinandrium hooded, as in the genus. Capsule densely muricate.

Mexico to Brazil; Cuba to Lesser Antilles.

COLÓN: summit of Cerro Santa Rita, 1200–1500 ft., *Allen & Allen 5112*. COCLÉ: western slope and summit of Cerro Valle Chiquito, 700–800 m., *Seibert 512*; vicinity El Valle de Antón, 600–1000 m., *Allen 1249*. CHIRIQUÍ: vicinity Casita Alta, Finca Lérída, eastern slopes of Chiriquí Volcano, 1500–2000 m., *Woodson, Allen & Seibert 834*; vicinity Cerro Punta, headwaters of the Río Chiriquí Viejo, 2000 m., *Allen 1529*.

Most of the specimens cited above are sterile, and the determinations must be regarded as provisional. In particular, the collections from Chiriquí Province appear quite atypical in the narrower leaves and may possibly represent *Dichaea trichocarpa* (Sw.) Lindl.

4. *DICHAEA PANAMENSIS* Lindl. Gen. & Sp. Orch. Pl. 209. 1833.

Epithecia panamensis Schltr. in Orchis 9:23. 1915.

Dichaeopsis panamensis (Lindl.) Schltr. in Beih. Bot. Centralbl. 36²:519. 1918.

Epiphytic herbs with slender, monopodial, often rather flexuose foliaceous stems, 4 to about 18 cm. tall. Leaves 2-ranked on the stems, narrowly linear-lanceolate, acute and apiculate or acuminate, subcoriaceous, often glaucous, usually in alternating groups of unequal length, the blades articulated to the sheathing bases and ultimately deciduous below, 1–4 cm. long and 0.2–0.45 cm. wide. Peduncles filiform, 1-flowered, produced from the axils of the leaves. Flowers small, translucent, white spotted with pink or purple. Sepals free, the dorsal sepal oblong-lanceolate, acute, slightly concave, about 5 mm. long and 2 mm. wide, the lateral sepals obliquely oblong-lanceolate, acute, slightly concave, about 6 mm. long and about 2.5 mm. wide at the base. Petals shorter and broader than the sepals, rather obliquely elliptic-oblong, shortly acute, about 4.5 mm. long and 3.5 mm. wide. Lip sagittate to obovate-spatulate in outline when spread out, the ligular claw slightly arcuate in profile, abruptly contracted at the base and continuous with the short column foot, the blade abruptly dilated and 3-lobed, the short, acute lateral lobes retrorse in natural position, the mid-lobe broadly triangular, shortly acute with a short central keel on the lower surface at the apex, the entire lip, including the claw, about 7 mm. long and 6 mm. wide. Column wingless, stout, about 3 mm. long, the apex truncate, the under-surface with a short, infra-stigmatic ligule, the base produced into a very short foot. Anther and pollinia typical of the genus.



Fig. 212. *Dichaea panamensis*
(577)

Mexico, British Honduras, Guatemala, Honduras, Costa Rica, and Panama.

CANAL ZONE: hills between Río Grande and Puerto Vidal, on the road to Arraiján, 50–150 m., *Pittier* 2716; Barro Colorado Island, Gatún Lake, 100 m., *Wetmore & Abbe* 249; Miraflores, *Powell* 3133; Pedro Miguel, *Powell* 3033; Río Indio, Madden Lake area, 70–80 m., *Dodge & Allen* 17312; Chagres, *Fendler* 333. PANAMÁ: without definite locality, *Cuming* 1292; low thick scrub along the Río Tecúmen, north of the Chepo road, about 30 m., *Hunter & Allen* 221; Chiva-Chiva, *Powell* 3021, 3066; Río Tapia, *Standley* 30671; hills east of Panama City, *Powell* 175; vicinity Paja, *Powell* 3139, 3240; Chorrera, *Powell* 3078; Panama Bay, Perlas Archipelago, San José Island, *Johnston* 400, 1013, 1216, 1219. COCLÉ: Bismarck, above Penonomé, 2000–3000 ft., *R. S. Williams* 441; vicinity El Valle de Antón, 600–1000 m., *Fairchild* s. n., *Allen* 1246.

A very common lowland species, widely distributed in Central America.

5. *DICHAEA POWELLII* Schltr. in Fedde Rep. Sp. Nov. Beih. 17:90. 1922.

Dichaea Brenesii Schltr. loc. cit. 19:264. 1923.

Erect, epiphytic herbs with unbranching, monopodial, foliaceous stems 15–45 cm. tall, enveloped in the conduplicate bases of the many, distichously imbricating leaves. Leaf blades spreading, linear-ligular, acute to acuminate, coriaceous, 6–13.5 cm. long and 0.3–0.6 cm. wide, the blades articulated to the persistent sheathing bases and ultimately deciduous below. Inflorescences short, slender, 1-flowered scapes about 1.5–2 cm. long, produced from the leaf axils, terminating at the apex in a short, broadly cucullate bract which envelops and exceeds the ovary. Flowers relatively large for the genus, the sepals and petals pale green to white, the lip purple or pale green heavily marked with purple. Sepals free, glabrous, ovate-lanceolate to oblong-lanceolate, acute, 8–10 mm. long and 4 mm. wide. Petals elliptic-ovate, obtuse and apiculate to shortly acute, slightly concave, about 10 mm. long and 4 mm. wide. Lip with a broad ligular claw at the base, the blade dilated and 3-lobed, broadly trulliform when spread out, deeply concave in natural position, the short, obtuse to acute lateral lobes somewhat retrorse, the mid-lobe semi-orbicular when spread out, more or less conduplicate and shortly acute in natural position, the entire lip, including the claw, about 8 mm. long and 8 mm. wide. Column broad, stout, about 4–6 mm. long, the under-surface with a short, minutely papillose, infra-stigmatic ligule. Capsule glabrous.

Honduras, Costa Rica, and Panama.

PANAMÁ: foothills east of Panama City, *Powell* 23. COLÓN: Cerro Santa Rita, 1200 ft., *Allen & Fairchild* 5186, 5193.

87. *CAMPYLOCENTRUM* Benth.

CAMPYLOCENTRUM Benth. in Jour. Linn. Soc. 18:337. 1881; Benth. & Hook.

Gen. Pl. 3:585. 1883 (as *Campylocentron*).

Todaroa A. Rich. in Ann. Sci. Nat. III, 3:28. 1845.

Pseudobulbless, epiphytic herbs with either distichous, monopodial, leafy stems, or stemless and leafless clusters of thickened roots. Leaves oblong or ligular, coriaceous, sometimes absent. Inflorescences short, usually densely flowered racemes, produced from the axils of the leaves or from the centers of the root clusters. Flowers minute, often more or less distichously arranged on the scape. Sepals subequal, free, connivent, or with the apices spreading. Petals subequal to the sepals or sometimes smaller. Lip sessile at the base of the column and produced into an elongate, often recurved spur, the blade entire or 3-lobed, subequal to the sepals in length, often with the lateral margins more or less convolute at the base. Column very short, wingless, the base without a foot. Anther terminal, operculate, incumbent, 2-celled; pollinia 2, waxy.

About 30 species of tropical American epiphytes, ranging from Florida, Mexico, and the West Indies to Brazil. Three species are known from Panama, but one is represented only by sterile material.

- a. Plants entirely leafless, consisting of spreading clusters of thickened roots..... 3. *C. sp.*
 aa. Plants with monopodial, foliaceous stems.
 b. Leaves less than 1.5 cm. long. Highland species..... 1. *C. BRENESII*
 bb. Leaves 4-9 cm. long. Lowland species..... 2. *C. MICRANTHUM*
1. *CAMPYLOCENTRUM BRENESII* Schltr. in Fedde Rep. Sp. Nov. Beih. 19:268. 1923.

Small, epiphytic herbs with erect, distichous, monopodial, foliaceous stems 2-12 cm. tall. Leaves spreading, the blades oblong to elliptic-oblong, rather obliquely acute, coriaceous, about 7-14 mm. long and 3.5-5 mm. wide, articulated to the sheathing bases and ultimately deciduous below. Inflorescences short, lateral, 5-10-flowered racemes produced from the leaf axils. Flowers minute, distichously arranged on the scape. Sepals narrowly lanceolate-ligular, acute, about 1.75 mm. long, the laterals usually rather oblique. Petals subequal to the sepals, rather obliquely linear-lanceolate, acute. Lip 3-lobed, about 1.75 mm. long and 1 mm. wide, the lateral lobes short, obtuse, the mid-lobe narrowly triangular, the base produced into a somewhat laterally compressed, obtuse spur about 1 mm. long. Column very short, typical of the genus.

Guatemala, Costa Rica, and Panama.

CHIRIQUÍ: vicinity Bajo Mono and Quebrada Chiquero, 1500 m., Woodson & Schery 579.

2. *CAMPYLOCENTRUM MICRANTHUM* (Lindl.) Rolfe in Orch. Rev. 11:245. 1903.

Angraecum micranthum Lindl. in Bot. Reg. 21: t. 1772. 1836.

Angraecum brevifolium Lindl. loc. cit. n. s. 3: sub t. 68. 1840.

Angraecum Lansbergii Reichb. f. in Nederl. Kruidk. Arch. 4:316. 1859.

Aeranthus micranthus Reichb. f. in Walp. Ann. 6:901. 1864.

Aeranthus Lansbergii Reichb. f. loc. cit. 1864.

Campylocentrum panamense Ames, Orchidaceae 7:88. 1922.

Campylocentrum peniculus Schltr. in Fedde Rep. Sp. Nov. Beih. 17:91. 1922.



Fig. 213. *Campylocentrum micranthum*
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Epiphytic herbs, with more or less flexuose, monopodial, foliaceous stems, up to about 35 cm. long, enveloped in the conduplicate bases of the distichous leaves. Roots alternating with the leaves and equidistantly distributed along the stem. Leaves broadly ligular to elliptic-oblong, obtuse to unequally bilobed at the apex, the blades about 4-9 cm. long and 1.2-2 cm. wide, articulated to the persistent, sheathing bases and ultimately deciduous below. Inflorescences short, lateral, densely flowered racemes 3-4 cm. long, produced from the sides of the stems just below the point of emergence of the roots. Flowers very small, white or yellowish white, distichously arranged on the scape. Sepals of about equal length, linear-ligular, shortly acuminate, slightly concave, the margins of the lower portions connivent, with the apices spreading, 4-4.5 mm. long and about 0.75 mm. wide; lateral sepals usually rather oblique. Petals narrowly ligular, rather concave, acute, subequal to the dorsal sepal in length, about 4 mm. long and 0.75-1 mm. wide. Lip 3-lobed, about equaling the lateral sepals in length, the sessile base affixed to the base of the column and produced into an elongate, obtuse, incurving spur, about 4 mm. long, the short, lateral lobes of the blade acute or semiovate, erect in natural position, about 1.5 mm. wide when spread out, the mid-lobe narrowly triangular or linear-ligular, rather acute, about 2.5 mm. long and 0.75 mm. wide.

Cuba, Santo Domingo, Jamaica, Trinidad, Mexico to British Guiana, Brazil and Peru.

CANAL ZONE: Las Cascadas, *Powell 184, Standley 25748, 29699*; drowned forest near Vigía and San Juan de Pequeñi, Madden Lake area, 66 m., *Dodge, Steyermark & Allen 16582*; in woods, near Gatún, *Sutton Hayes 988*; vicinity Gamboa, 100 m., *Allen 3444, Pittier 2612*. BOCAS DEL TORO: Water Valley, vicinity Chiriquí Lagoon, *von Wedel 1386, 1451, 1483, 1655, 1707*.

3. *CAMPYLOCENTRUM* sp.

There is a specimen in the Ames Herbarium of a leafless species of *Campylocentrum* from Panama, the single inflorescence being very immature and without flowers. It seems likely that it represents *Campylocentrum fasciola* (Lindl.) Cogn. which is widely distributed from Mexico and the West Indies to Brazil.

PANAMÁ: hills east of Panama City, *Powell 320*.



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